

Washington Water Supply Outlook Report April 1, 2014



Pilot, Mike Nehring with Northwest Helicopters. Mt. Baker in the back ground.
Photo by Scott Pattee

Water Supply Outlook Reports and Federal - State – Private Cooperative Snow Surveys

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How forecasts are made

Most of the annual streamflow in the western United States originates as snowfall that has accumulated in the mountains during the winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Measurements of snow water equivalent at selected manual snow courses and automated SNOTEL sites, along with precipitation, antecedent streamflow, and indices of the El Niño / Southern Oscillation are used in computerized statistical and simulation models to prepare runoff forecasts. These forecasts are coordinated between hydrologists in the Natural Resources Conservation Service and the National Weather Service. Unless otherwise specified, all forecasts are for flows that would occur naturally without any upstream influences.

Forecasts of any kind, of course, are not perfect. Streamflow forecast uncertainty arises from three primary sources: (1) uncertain knowledge of future weather conditions, (2) uncertainty in the forecasting procedure, and (3) errors in the data. The forecast, therefore, must be interpreted not as a single value but rather as a range of values with specific probabilities of occurrence. The middle of the range is expressed by the 50% exceedance probability forecast, for which there is a 50% chance that the actual flow will be above, and a 50% chance that the actual flow will be below, this value. To describe the expected range around this 50% value, four other forecasts are provided, two smaller values (90% and 70% exceedance probability) and two larger values (30%, and 10% exceedance probability). For example, there is a 90% chance that the actual flow will be more than the 90% exceedance probability forecast. The others can be interpreted similarly.

The wider the spread among these values, the more uncertain the forecast. As the season progresses, forecasts become more accurate, primarily because a greater portion of the future weather conditions become known; this is reflected by a narrowing of the range around the 50% exceedance probability forecast. Users should take this uncertainty into consideration when making operational decisions by selecting forecasts corresponding to the level of risk they are willing to assume about the amount of water to be expected. If users anticipate receiving a lesser supply of water, or if they wish to increase their chances of having an adequate supply of water for their operations, they may want to base their decisions on the 90% or 70% exceedance probability forecasts, or something in between. On the other hand, if users are concerned about receiving too much water (for example, threat of flooding), they may want to base their decisions on the 30% or 10% exceedance probability forecasts, or something in between. Regardless of the forecast value users choose for operations, they should be prepared to deal with either more or less water. (Users should remember that even if the 90% exceedance probability forecast is used, there is still a 10% chance of receiving less than this amount.) By using the exceedance probability information, users can easily determine the chances of receiving more or less water.

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Washington Water Supply Outlook

April 2014

General Outlook

Washington seems to have averted what could have been a disastrous drought just to fall into the lap of one of the states' worst natural disasters to ever hit, one that came with no real warning to the good folks of Oso, WA. As we march into another sunny spring the grass will grow and the flowers will bloom but those affected by the Snohomish County landslide will not forget or be forgotten. Warmer mountain temperatures seem to have advanced the ripening of this years' snowpack with measured densities coming in higher than normal, effectively pushing the snowpack 2-3 weeks ahead of schedule. Weather forecasts continue to trend towards warm and dry which could facilitate an early start to the spring melt, potentially causing rivers to rise higher and quicker than normally expected.

Snowpack

The April 1 statewide SNOTEL readings were 100% of normal but vary across the state. Snowpack appeared to have increased at higher elevations however there was some indication of lower elevation snow courses having little to no snow due to rain on snow events as well as warmer than normal temperatures during the first half of the month. Readings from the Pend Oreille, including Idaho and Montana data, reported the highest at 140% of normal. Westside medians from SNOTEL, and April 1 snow surveys, included the North Puget Sound river basins with 117% of normal, the Central and South Puget river basins averaged 99%, and the Lewis-Cowlitz basins with 92% of normal. Snowpack along the east slopes of the Cascade Mountains included the Yakima and Wenatchee areas with 101% and 105% respectively. Snowpack in the Spokane River Basin stood at 117% and the Walla Walla River Basin had 96% of the long term median.

BASIN	PERCENT OF LAST YEAR	PERCENT OF AVERAGE
Spokane	130	117
Newman Lake	79	95
Pend Oreille	152	140
Okanogan	93	98
Methow	114	111
Conconully Lake	48	56
Central Columbia	120	105
Upper Yakima	110	104
Lower Yakima	103	98
Ahtanum Creek	85	80
Walla Walla	110	96
Lower Snake	141	115
Cowlitz	92	114
Lewis	57	71
White	98	115
Green	78	78
Puyallup	104	112
Cedar	70	91
Snoqualmie	76	99
Skykomish	72	94
Skagit	116	121
Nooksack	93	117
Olympic Peninsula	65	82

Precipitation

With nearly twice the normal rainfall in March most basins in the state have erased the previous deficits to come within striking distance of normal water year to date precipitation. Only a hand full of stations reported below average monthly precipitation. Basin precipitation amounts were pretty even throughout the state with a low of 112% in the Upper Columbia to a high of 212% in the North Puget Sound. The wettest spot in the state was reported at Alpine Meadows SNOTEL in the Tolt River Basin with a March accumulation of 34.8 inches, or 198% of average. The highest percent of average was at Darrington, WA, near the location of the devastating Oso landslide, which received 266% of average precipitation.

RIVER BASIN	MARCH PERCENT OF AVERAGE	WATER YEAR PERCENT OF AVERAGE
Spokane	178	93
Pend Oreille	168	89
Upper Columbia	112	77
Central Columbia	192	93
Upper Yakima	172	96
Lower Yakima	180	94
Walla Walla	163	105
Lower Snake	159	101
Lower Columbia	174	90
South Puget Sound	175	102
Central Puget Sound	191	104
North Puget Sound	212	94
Olympic Peninsula	148	73

Reservoir

Seasonal reservoir levels in Washington can vary greatly due to specific watershed management practices required in preparation for irrigation season, fisheries management, power generation, municipal demands and flood control. However with the bulk of winter snow and precipitation already on the ground we will start to see reservoirs fill with spring runoff. Reservoir storage in the Yakima Basin was 610,000-acre feet, 119% of average for the Upper Reaches and 201,000-acre feet or 133% of average for Rimrock and Bumping Lakes. The power generation reservoirs included the following: Coeur d'Alene Lake, 192,000 acre feet, 116% of average and 80% of capacity; and the Skagit River reservoirs at 57% of average and 30% of capacity. Recent climate impacts and management procedures may affect these numbers on a daily or weekly basis.

BASIN	PERCENT OF CAPACITY	CURRENT STORAGE AS PERCENT OF AVERAGE
Spokane	80	116
Pend Oreille	42	83
Upper Columbia	89	102
Central Columbia	34	89
Upper Yakima	73	119
Lower Yakima	87	133
Lower Snake	61	88
North Puget Sound	30	57

For more information contact your local Natural Resources Conservation Service office.

Streamflow

With the addition of more snow and above normal precipitation all forecasts increased by 5-20% this month. Forecasts vary from 78% of average for the Colville River at Kettle Falls to 124% of average for the Okanogan River at Malott. April-September forecasts for some Western Washington streams include the Cedar River near Cedar Falls, 108%; White River, 109%; and Skagit River, 116%. Some Eastern Washington streams include the Yakima River near Parker, 102%; Wenatchee River at Plain, 105% and Spokane River near Post Falls, 115%. Volumetric forecasts are developed using current, historic and average snowpack, precipitation and streamflow data collected and coordinated by organizations cooperating with NRCS. March runoff varied greatly by basin and is often influenced this time of year by reservoir control which may cause sudden changes in daily flows. Caution should be taken when working or playing in or near streams influenced by spring snowmelt.

BASIN	PERCENT OF AVERAGE FORECAST (50 PERCENT CHANCE OF EXCEEDENCE)
Spokane	83-115
Pend Oreille	86-134
Upper Columbia	78-135
Central Columbia	95-105
Upper Yakima	96-110
Lower Yakima	97-110
Walla Walla	100
Lower Snake	102-134
Lower Columbia	87-107
South Puget Sound	85-109
Central Puget Sound	100-122
North Puget Sound	103-106
Olympic Peninsula	96-97

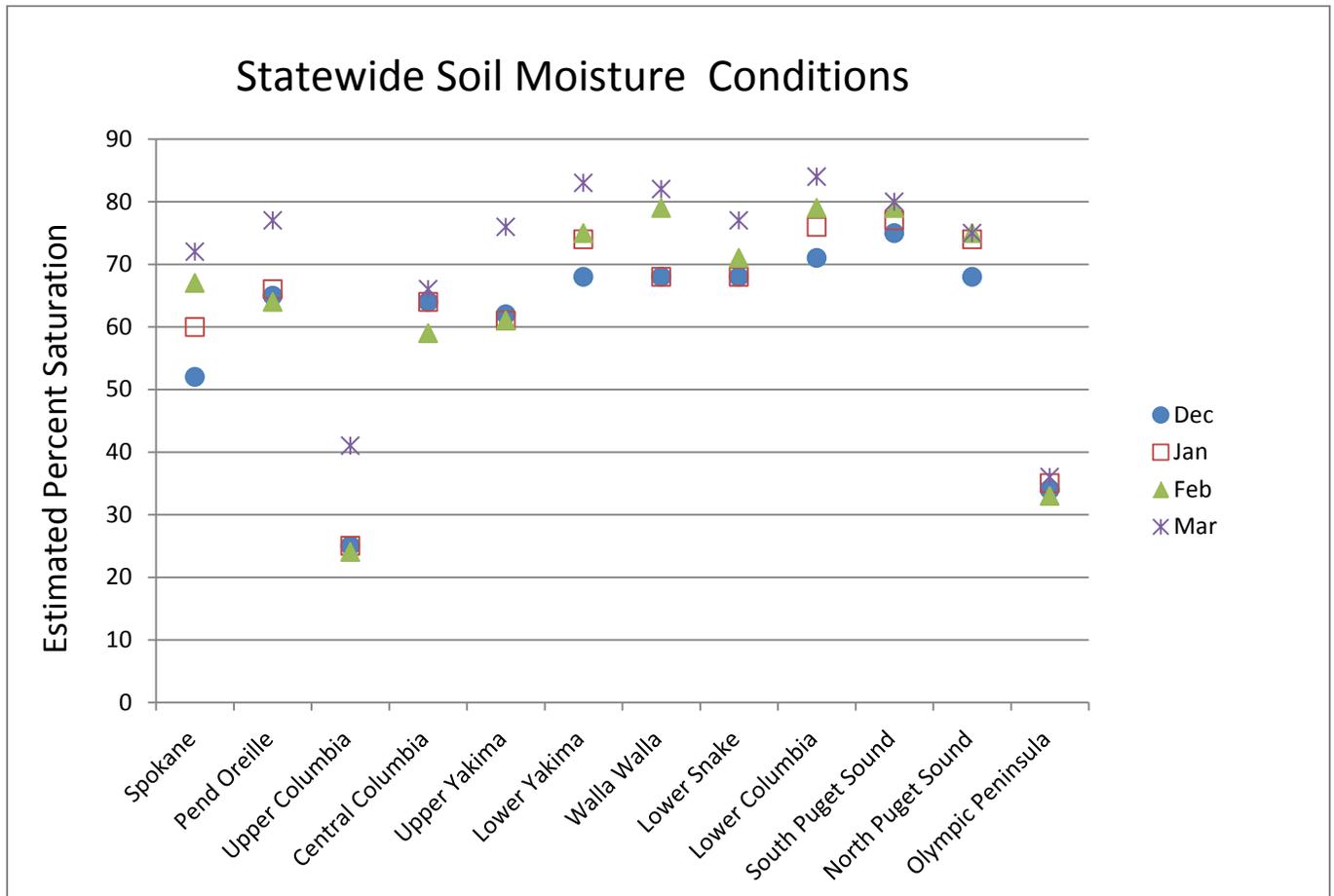
STREAM	PERCENT OF AVERAGE MARCH RUNOFF
Pend Oreille at Albeni Fall Dam	113
Kettle at Laurier	59
Columbia at Birchbank	97
Spokane at Spokane	185
Similkameen at Nighthawk	111
Okanogan at Tonasket	135
Methow at Pateros	75
Chelan at Chelan	112
Wenatchee at Pashastin	142
Cle Elum near Roslyn	168
Yakima at Parker	163
Naches at Naches	218
Grande Ronde at Troy	202
Snake below Lower Granite Dam	128
Columbia River at The Dalles	126
Cowlitz below Mayfield Dam	225
Skagit at Concrete	185
Dungeness near Sequim	178

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Soil Moisture

Current soil moisture data is available from a limited number of SNOTEL sites scattered throughout each basin. As the effort continues to install additional sensors and more years of data are acquired this information will become invaluable to the streamflow forecasting community. Light fall precipitation created drier than optimal soil moisture conditions coming into winter. However greater than normal precipitation during February and March helped buffer soil moisture levels back to near normal conditions for this time of year. Additional increases should be expected as the snow ripens and begins the normal spring melt phase. Having elevated soil moisture levels now is also a good indicator for increased runoff in the spring.

BASIN	ESTIMATED PERCENT SATURATION
Spokane	72
Pend Oreille	77
Upper Columbia	41
Central Columbia	66
Upper Yakima	76
Lower Yakima	83
Walla Walla	82
Lower Snake	77
Lower Columbia	84
South Puget Sound	80
Central Puget Sound	N/A
North Puget Sound	75
Olympic Peninsula	36



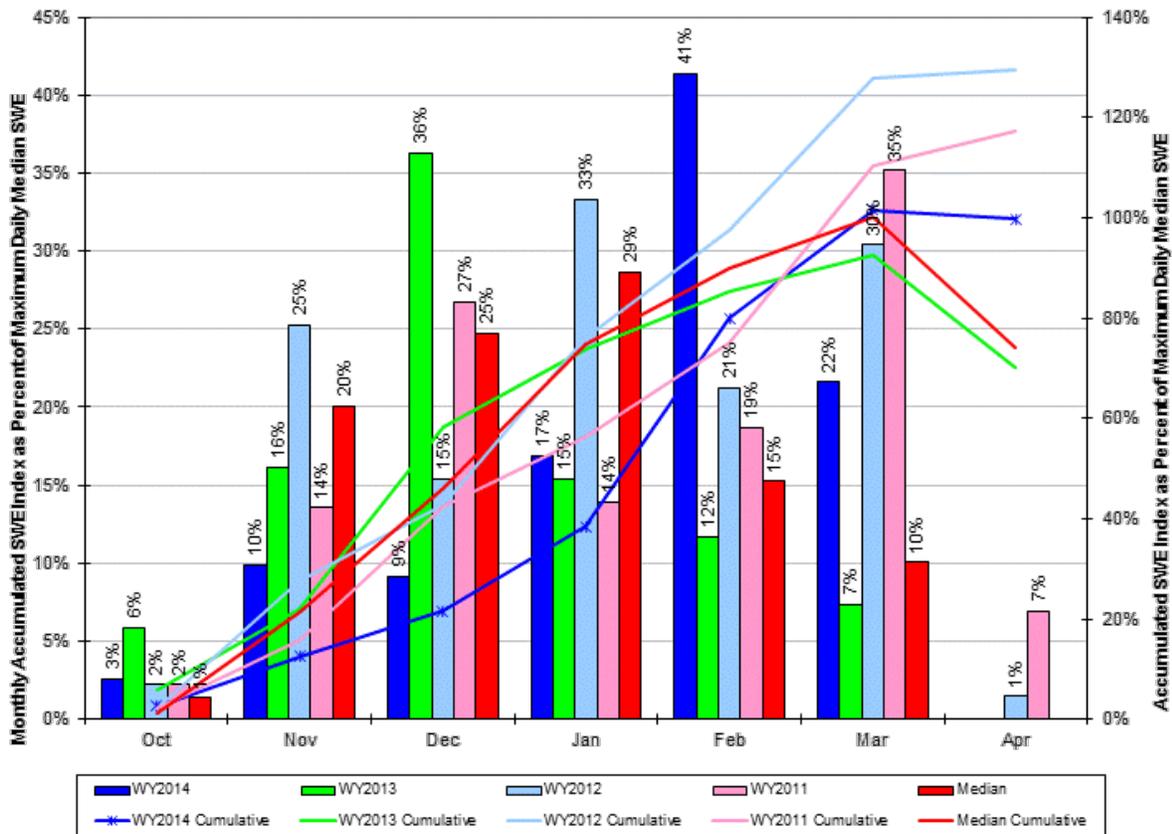
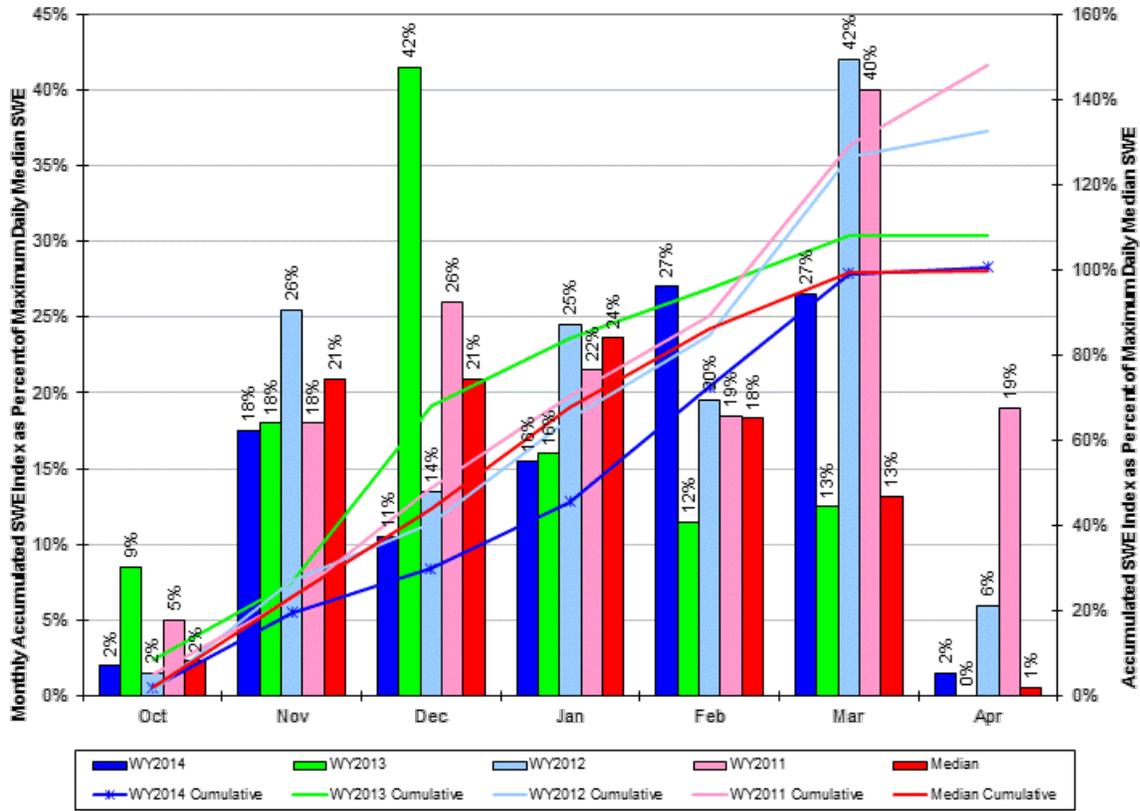
BASIN SUMMARY OF
SNOW COURSE DATA

APRIL 2014

SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1971-00	SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1971-00
ABERDEEN LAKE CAN.	4000	3/26/14	24	7.2	5.7	5.6	GRIFFIN CR DIVIDE	5150	3/26/14	40	14.0	6.3	8.4
ALPINE MEADOWS	3500	4/01/14	88	37.0	59.8	40.2	GROUSE CAMP SNOTEL	5390	4/01/14	41	18.9	12.6	18.0
ALPINE MEADOWS SNTL	3500	4/01/14	90	47.9	73.7	51.0	HAMILTON HILL CAN.	4550	3/31/14	39	12.3	8.5	14.0
AMBROSE	6480	3/29/14	56	16.6	9.9	10.4	HAND CREEK SNOTEL	5030	4/01/14	44	15.0	7.2	11.1
ASHLEY DIVIDE	4820	3/25/14	27	8.6	2.8	4.4	HARTS PASS SNOTEL	6490	4/01/14	118	47.8	43.8	41.2
BADGER PASS SNOTEL	6900	4/01/14	104	41.7	32.3	29.8	HARTS PASS	6500	3/27/14	124	44.4	41.7	36.7
BAIRD #2	3220	3/27/14	20	5.7	5.6	6.8	HELL ROARING DIVIDE	5770	3/30/14	101	33.0	26.1	25.8
BAREE CREEK	5500	3/31/14	112	44.7	36.7	34.9	HERRIG JUNCTION	4850	3/25/14	88	31.0	22.8	24.1
BAREE MIDWAY	4600	3/31/14	91	33.8	25.5	27.8	HIGH RIDGE SNOTEL	4920	4/01/14	53	20.3	19.2	20.7
BAREE TRAIL	3800	3/31/14	26	9.1	7.8	7.2	HOLBROOK	4530	3/25/14	30	10.7	4.1	6.8
BARKER LAKES SNOTEL	8250	4/01/14	70	20.0	12.0	13.9	HOODOO BASIN SNOTEL	6050	4/01/14	146	52.3	36.6	38.9
BARNES CREEK CAN.	5320	4/01/14	65	22.2	18.8	20.4	HUCKLEBERRY SNOTEL	2250	4/01/14	0	.0	.0	.0
BASIN CREEK SNOTEL	7180	4/01/14	47	12.3	6.0	7.5	HUMBOLDT GLCH SNOTEL	4250	4/01/14	53	18.0	9.5	9.1
BASSOO PEAK	5150	3/26/14	36	12.6	6.6	7.8	HURRICANE	4500	3/28/14	31	10.7	23.1	15.0
BEAVER CREEK TRAIL	2200	3/27/14	33	12.7	12.8	9.2	INDIAN ROCK SNOTEL	5360	4/01/14	49	19.5	23.7	--
BEAVER PASS	3680	3/30/14	71	26.4	37.1	26.0	IRENE'S CAMP	5530	3/25/14	35	8.6	9.0	8.6
BEAVER PASS SNOTEL	3630	4/01/14	99	39.5	44.6	32.8	ISINTOK LAKE CAN.	5100	3/26/14	31	6.4	7.0	7.2
BIG WHITE MTN CAN.	5510	3/26/14	58	17.4	--	20.0	JASPER PASS AM	5400	4/02/14	197	88.6	97.0	77.0
BLACK MOUNTAIN	7750	3/25/14	55	15.3	11.3	14.1	JUNE LAKE SNOTEL	3440	4/01/14	58	22.5	53.7	34.5
BLACK PINE SNOTEL	7100	4/01/14	55	17.9	7.9	9.6	KELLER RIDGE	3700	3/27/14	3	.5	3.8	--
BLACKWALL PILL CAN.	6370	3/31/14	108	37.4	28.3	35.1	KELLOGG PEAK	5560	3/31/14	66	24.2	18.3	24.7
BLEWETT PASS#2SNOTEL	4240	4/01/14	27	13.0	6.0	13.9	KISHENEH	3890	3/26/14	38	9.8	7.2	6.6
BONAUPART SOUTH	4660	3/28/14	10	2.3	5.6	--	KLESILKA CAN.	3450	4/01/14	33	13.5	12.0	11.5
BRENDA MINE CAN.	4450	3/27/14	39	11.0	10.0	12.5	KRAFT CREEK SNOTEL	4750	4/01/14	50	22.4	9.6	--
BROOKMERE CAN.	3000	3/31/14	19	6.2	5.7	7.9	LAMB BUTTE	3700	3/27/14	46	15.8	16.0	--
BROWN TOP AM	6000	3/31/14	170	58.9	54.4	53.4	LIGHTNING LAKE CAN.	3700	3/26/14	39	12.1	11.0	12.0
BROWNS PASS	326/14	0	.0	1.5	--	--	LOGAN CREEK	4300	3/28/14	33	10.7	4.2	5.8
BRUSH CREEK TIMBER	5000	3/27/14	50	19.7	10.0	6.1	LOLO PASS SNOTEL	5240	4/01/14	111	39.0	21.9	27.1
BUCKINGHORSE SNOTEL	4870	4/01/14	109	44.9	64.5	--	LONE PINE SNOTEL	3930	4/01/14	67	25.0	49.3	35.2
BULL MOUNTAIN	6600	3/28/14	24	8.8	6.1	5.6	LOOKOUT SNOTEL	5140	4/01/14	85	32.4	22.5	26.2
BUMPING LAKE (NEW)	3400	4/02/14	32	12.1	12.5	15.8	LOST HORSE MTN CAN.	6300	4/01/14	41	11.5	9.8	9.4
BUMPING RIDGE SNOTEL	4610	4/01/14	76	27.6	22.0	25.8	LOST HORSE SNOTEL	5120	4/01/14	34	10.5	14.4	18.6
BUNCHGRASS MDWSNOTEL	5000	4/01/14	86	26.8	23.0	26.2	LOST LAKE SNOTEL	6110	4/01/14	152	59.6	41.6	52.3
BURNT MOUNTAIN PIL	4170	4/01/14	44	17.2	21.7	16.3	LOST LAKE	4070	3/28/14	17	4.3	6.1	--
BUTTE CREEK #2	326/14	22	5.8	7.4	--	--	LOUP LOUP CAMPGROUND	326/14	35	8.6	8.6	--	
BUTTERMILK BUTTE	5250	3/28/14	41	14.1	13.0	--	LOWER SANDS CREEK #2	3120	3/27/14	51	18.6	17.2	16.9
CALAMITY SNOTEL	2500	4/01/14	0	.0	.0	--	LUBBRECHT FOREST NO 3	5450	3/28/14	26	8.4	2.3	4.6
CARAMI CAN.	4100	3/27/14	16	3.3	--	5.6	LUBBRECHT FOREST NO 4	4650	3/28/14	10	3.6	.0	.4
CAYUSE PASS SNOTEL	5240	4/01/14	141	50.3	59.1	--	LUBBRECHT FOREST NO 6	4040	3/28/14	15	5.6	.0	.6
CHESSMAN RESERVOIR	6200	3/25/14	33	10.0	4.8	2.6	LUBBRECHT HYDRO PLOT	4200	3/28/14	18	7.4	.0	.6
CHEWALAH #2	4930	3/25/14	43	12.9	15.9	16.3	LUBBRECHT SNOTEL	4680	4/01/14	19	7.1	.0	1.6
CHICKEN CREEK	4060	3/25/14	59	20.5	16.4	13.8	LYNN LAKE SNOTEL	5980	4/01/14	156	59.8	54.4	57.6
CITY CABIN	2390	4/01/14	10	3.2	8.4	8.5	LYNN LAKE	4000	4/01/14	---	19.8E	33.0	18.0
COLD CREEK STRIP	6020	3/25/14	28	6.4	10.8	8.5	LYNN LAKE SNOTEL	3900	4/01/14	55	19.8	33.5	--
COMBINATION SNOTEL	5600	4/01/14	24	8.1	2.8	4.2	MARIAS PASS	5250	3/27/14	61	20.9	14.2	14.4
COPPER BOTTOM SNOTEL	5200	4/01/14	27	9.6	.0	--	MARTEN LAKE AM	3600	4/02/14	156	70.2	96.0	70.0
COPPER MOUNTAIN	7700	3/25/14	44	12.9	7.0	9.9	MARTEN RIDGE SNOTEL	3520	4/01/14	129	56.9	71.5	--
CORRAL PASS SNOTEL	5800	4/01/14	100	38.8	31.9	33.7	MAZAMA	326/14	26	9.7	2.6	--	
COTTONWOOD CREEK	6400	3/27/14	32	9.1	6.1	7.3	MCCULLOCH CAN.	4200	3/28/14	21	6.7	6.6	6.1
COUGAR MTN. SNOTEL	3200	4/01/14	23	9.9	23.3	14.1	MEADOWS CABIN	1900	3/31/14	15	6.3	.0	.6
COX VALLEY	4500	3/28/14	72	27.3	42.4	36.0	MEADOWS PASS SNOTEL	3230	4/01/14	63	25.8	33.1	20.6
COYOTE HILL	4200	3/27/14	32	12.7	6.5	7.0	METEOR	325/14	0	.0	.0	--	
DALY CREEK SNOTEL	5780	4/01/14	52	17.5	8.1	9.6	M F NOOKSACK SNOTEL	4970	4/01/14	157	75.7	70.3	59.1
DEER PARK	5200	4/01/14	42	16.1	21.3	16.7	MICA CREEK SNOTEL	4510	4/01/14	62	25.4	18.7	20.3
DESERT MOUNTAIN	5600	3/28/14	62	19.5	13.2	12.6	MINERAL CREEK	4000	3/25/14	49	17.2	11.0	15.4
DEVILS PARK	5900	3/27/14	147	53.2	38.6	38.7	MISSEZULA MTN CAN.	5080	4/01/14	38	11.6	6.6	9.5
DISAULTY PASS	326/14	8	2.1	5.1	--	--	MISSION CREEK CAN.	5840	3/31/14	63	21.8	21.5	20.0
DISCOVERY BASIN	7050	3/26/14	45	13.6	7.6	9.2	MONASHEE PASS CAN.	4500	4/01/14	46	15.0	11.6	13.5
DIX HILL	6400	3/30/14	46	15.2	6.0	9.1	MORSE LAKE SNOTEL	5410	4/01/14	129	51.5	55.2	52.3
DOCK BUTTE AM	3800	4/02/14	150	67.5	84.0	53.5	MOSES MOUNTAIN (2)	4800	4/01/14	21	7.3	17.9	13.4
DOMMERIE FLATS	2200	4/02/14	0	.0	.0	.0	MOSES MTN SNOTEL	5010	4/01/14	32	9.2	19.9	14.6
DUNCAN RIDGE	5370	3/25/14	14	3.7	6.6	4.7	MOSES PEAK	6650	4/01/14	46	14.1	30.3	20.1
DUNGENESS SNOTEL	4010	4/01/14	15	5.7	11.8	5.4	MOSQUITO RDG SNOTEL	5200	4/01/14	92	35.8	32.4	31.6
EASY PASS AM	5200	4/02/14	180	81.0	93.0	73.8	MOULTON RESERVOIR	6850	4/02/14	34	10.6	4.4	6.3
EL DORADO MINE	7800	3/26/14	54	17.8	8.7	17.4	MOUNT BLUM AM	5800	4/02/14	156	70.2	75.0	61.0
ELBOW LAKE SNOTEL	3200	4/01/14	75	33.7	44.9	36.9	MOUNT CRAG SNOTEL	3960	4/01/14	49	19.4	35.2	28.5
EMERY CREEK SNOTEL	4350	4/01/14	56	20.5	13.3	13.7	MT. KOBAN CAN.	5500	3/29/14	31	8.1	19.7	12.5
ENDERBY CAN.	5800	3/31/14	121	45.3	46.5	40.1	MOUNT TOLMAN	2000	3/25/14	0	.0	.0	.0
ESPERON CK. MID CAN.	4250	3/26/14	37	10.0	13.6	14.6	MOWICH SNOTEL	3160	4/01/14	0	.0	.0	.0
ESPERON CK. UP CAN.	5050	3/26/14	43	13.0	16.3	17.1	MOUNT GARDNER	3300	4/01/14	19	7.5	15.8	9.5
FARRON CAN.	4000	3/31/14	33	10.9	10.2	12.5	MOUNT GARDNER SNOTEL	2920	4/01/14	23	9.1	16.6	12.9
FATTY CREEK	5500	3/31/14	99	34.6	21.1	21.2	MUTTON CREEK #1	5700	3/24/14	26	7.3	15.8	12.8
FISH CREEK	8000	4/04/14	56	17.6	7.3	9.0	N.P. ELK CR SNOTEL	6250	4/01/14	57	17.0	8.3	10.6
FISH LAKE	3370	4/01/14	76	32.8	27.6	27.4	NEVADA RIDGE SNOTEL	7020	4/01/14	73	22.1	12.3	13.9
FISH LAKE SNOTEL	3430	4/01/14	72	29.5	25.9	29.8	NEZ PERCE CMP SNOTEL	5650	4/01/14	65	19.9	11.9	13.0
FLATTOP MTN SNOTEL	6300	4/01/14	158	52.8	48.1	42.0	NOISY BASIN SNOTEL	6040	4/01/14	135	47.8	40.9	39.3
FLEECER RIDGE	7500	3/28/14	44	14.4	7.8	9.5	NORTH FORK JOCKO	6330	3/31/14	136	51.0	40.4	38.4
FOURTH OF JULY SUM	3200	3/31/14	8	2.3	3.4	3.4	OLALLIE PARK SNOTEL	4030	4/01/14	123	55.8	56.0	50.0
FREEZABOUT CK. TRAIL	3500	3/31/14	36	13.2E	11.3	9.6	OPHIR MDS	7150	3/30/14	66	20.5	9.6	14.8
FROHNER MDWS SNOTEL	6480	4/01/14	51	13.8	6.5	7.4	OYAMA LAKE CAN.	4100	3/31/14	26	6.8	5.4	6.7
FROST MEADOWS	4630	4/02/14	59	22.0	17.0	16.5	PARADISE SNOTEL	5130	4/01/14	166	81.1	78.2	67.0
GOAT CREEK	3600	3/26/14	12	3.2	4.9	2.8	PARK CK RIDGE SNOTEL	4600	4/01/14	107	48.8	47.1	44.4
GOLD MTN LOOKOUT	326/14	13	4.0	7.6	--	--	PEPPER CREEK SNOTEL	2140	4/01/14	0	.0	5.5	--
GRASS MOUNTAIN #2	2900	4/01/14	0	.0	--	1.1	PETERSON MDW SNOTEL	7200	4/01/14	54	14.9	8.5	9.6
GRAVE CRK SNOTEL	4300	4/01/14	60	21.9	14.3	13.8	PETTILJOHN CREEK	4300	3/28/14	12	3.0	5.4	--
GREEN LAKE SNOTEL	5920	4/01/14	70	22.2	24.2	22.3	PITGAIL PEAK SNOTEL	5800	4/01/14	151	64.0	49.8	50.2
GREYBACK RES CAN.	4700	3/28/14	37	10.1	10.0	9.2	PIKE CREEK SNOTEL	5930	4/01/14	51	12.0	8.2	22.9

SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1971-00
PIPESTONE PASS	7200	3/25/14	30	8.2	4.7	4.6
POPE RIDGE SNOTEL	3590	4/01/14	36	15.8	13.4	15.8
POSTILL LAKE CAN.	4200	3/31/14	29	8.7	7.5	8.8
POTATO HILL SNOTEL	4510	4/01/14	82	31.7	30.1	24.9
QUARTZ PEAK SNOTEL	4700	4/01/14	48	18.1	16.0	18.9
RAGGED MTN SNOTEL	4210	4/01/14	44	17.9	17.9	20.7
RAGGED RIDGE	3330	3/28/14	1	.2	4.4	1.0
RAINY PASS SNOTEL	4890	4/01/14	---	42.5	33.5	36.5
RAINY PASS	4780	4/01/14	115	53.3	31.2	--
REX RIVER SNOTEL	3810	4/01/14	75	33.5	43.3	34.7
ROCKER PEAK SNOTEL	8000	4/01/14	73	21.1	10.8	12.4
ROCKY CREEK AM	2100	4/02/14	60	27.0	60.0	--
ROLAND SUMMIT	5120	4/01/14	109	47.1	30.0	31.0
ROUND TOP MTN	4020	3/28/14	30	9.4	11.6	--
RUSTY CREEK	4000	3/24/14	3	1.0	5.7	4.9
SADDLE MTN SNOTEL	7900	4/01/14	106	36.4	20.1	22.9
SALMON MDWS SNOTEL	4460	4/01/14	19	6.6	9.7	9.1
SASSE RIDGE SNOTEL	4340	4/01/14	84	32.4	28.1	31.4
SATUS PASS	4030	3/28/14	12	4.9	7.1	7.0
SATUS PASS	3960	4/01/14	13	4.7	4.6	--
SAVAGE PASS SNOTEL	6170	4/01/14	102	36.7	23.3	24.4
SAWMILL RIDGE SNOTEL	4640	4/01/14	85	36.1	37.6	--
SCHREIBERS MDW AM	3400	4/02/14	90	40.5	65.0	45.0
SENTINEL BT SNOTEL	4680	4/01/14	35	8.7	8.8	8.1
SHEEP CANYON SNOTEL	3990	4/01/14	65	26.6	46.1	33.9
SHERWIN SNOTEL	3200	4/01/14	---	3.5	3.7	6.6
SILVER STAR MTN CAN.	5600	3/30/14	83	29.7	33.9	29.9
SKALKAHO SNOTEL	7260	4/01/14	90	30.5	17.9	21.4
SKITWISH RIDGE	5110	3/27/14	86	29.7	27.8	28.6
SKOOKUM CREEK SNOTEL	3310	4/01/14	59	35.3	54.0	29.3
SKOOKUM LAKES	4230	3/28/14	33	11.1	10.9	--
SLIDE ROCK MOUNTAIN	7100	3/26/14	61	20.2	13.6	12.9
SOURDOUGH GUL SNOTEL	4000	4/01/14	0	.0	.0	.0
SOUTH BALDY	4920	3/28/14	60	18.9	15.7	--
SPENCER MDW SNOTEL	3400	4/01/14	37	17.5	31.6	29.4
SPIRIT LAKE SNOTEL	3520	4/01/14	0	.1	15.6	1.2
SPOTTED BEAR MTN.	7000	3/28/14	56	18.8	8.8	12.2
SPRUCE SPGS SNOTEL	5700	4/01/14	43	16.8	9.0	13.8
STARVATION MOUNTAIN	6750	3/28/14	53	16.5	22.0	15.3

SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1971-00
STAHL PEAK SNOTEL	6030	4/01/14	123	40.4	34.5	33.3
STAMPEDE PASS SNOTEL	3850	4/01/14	85	33.4	32.9	40.3
STEMPLE PASS	6600	3/27/14	48	13.0	8.1	8.3
STEVENS PASS SNOTEL	3950	4/01/14	113	36.1	34.9	37.0
STORM LAKE	7780	3/26/14	54	15.5	10.5	12.6
STRANGER MOUNTAIN	4230	3/25/14	19	6.4	11.0	10.5
STRYKER BASIN	6180	3/25/14	110	40.4	33.4	28.2
SUMMERLAND RES CAN.	4200	3/27/14	38	11.1	8.9	8.9
SUMMIT G.S. #2	4600	3/26/14	33	8.6	10.2	8.9
SUNSET SNOTEL	5540	4/01/14	73	24.7	17.9	21.4
SURPRISE LKS SNOTEL	4290	4/01/14	92	39.3	46.5	45.5
SWAMP CREEK SNOTEL	3930	4/01/14	61	26.6	15.4	17.4
SWIFT CREEK SNOTEL	4440	4/01/14	105	41.9	70.0	61.0
TEN MILE LOWER	6600	3/26/14	45	14.2	7.6	5.7
TEN MILE MIDDLE	6800	3/26/14	58	16.6	8.8	9.8
THUNDER BASIN SNOTEL	4320	4/01/14	78	31.0	28.9	29.7
THUNDER BASIN	4200	3/31/14	80	26.4	21.0	20.0
THOMPSON CREEK	2500	3/28/14	1	.6	3.7	.0
THOMPSON RIDGE	4650	3/28/14	37	12.6	11.0	--
TINKHAM CREEK SNOTEL	2990	4/01/14	58	22.7	28.8	26.2
TOATS COULEE	2850	3/25/14	1	.2	2.6	.1
TOUCHET SNOTEL	5530	4/01/14	66	28.6	25.4	30.1
TRINKUS LAKE	6100	3/31/14	138	51.0	39.4	37.2
TROUGH #2 SNOTEL	5480	4/01/14	25	9.7	8.2	8.2
TROUT CREEK CAN.	5650	3/26/14	35	10.1	8.2	7.2
TRUMAN CREEK	4060	3/25/14	0	.0	1.5	2.5
TUNNEL AVENUE	2450	3/31/14	37	14.5	10.3	16.4
TWELVEMILE SNOTEL	5600	4/01/14	66	25.5	9.2	14.5
TWIN LAKES SNOTEL	6400	4/01/14	132	54.5	31.5	35.4
UPPER HOLLAND LAKE	6200	3/31/14	116	40.8	30.3	29.6
UPPER WHEELER SNOTEL	4330	4/01/14	26	10.3	7.9	12.2
VASEUX CREEK CAN.	4250	3/29/14	28	7.1	4.1	6.2
VULCAN MTN	4660	3/26/14	32	8.0	11.5	--
VULCAN ROAD	3840	3/26/14	24	6.1	8.1	--
WARM SPRINGS SNOTEL	7800	4/01/14	98	28.3	16.0	19.0
WATSON LAKES AM	4500	4/02/14	144	64.8	72.0	57.0
WATERHOLE SNOTEL	5010	4/01/14	93	36.4	49.0	39.4
WEASEL DIVIDE	5450	3/27/14	101	33.6	27.5	29.0
WELLS CREEK SNOTEL	4030	4/01/14	85	36.3	41.9	29.0
WEST SMAY CREEK	3600	4/01/14	64	28.6	36.6	--
WHITE PASS ES SNOTEL	4440	4/01/14	59	23.4	21.3	21.6
WHITE ROCKS MTN CAN.	7200	3/26/14	56	17.8	23.9	23.1





Natural Resources Conservation Service

Washington State
Snow, Water and Climate Services

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Helpful Internet Addresses

NRCS Snow Survey and Climate Services Homepages

Washington:
<http://www.wa.nrcs.usda.gov/snow>

Oregon:
<http://www.or.nrcs.usda.gov/snow>

Idaho:
<http://www.id.nrcs.usda.gov/snow>

National Water and Climate Center (NWCC):
<http://www.wcc.nrcs.usda.gov>

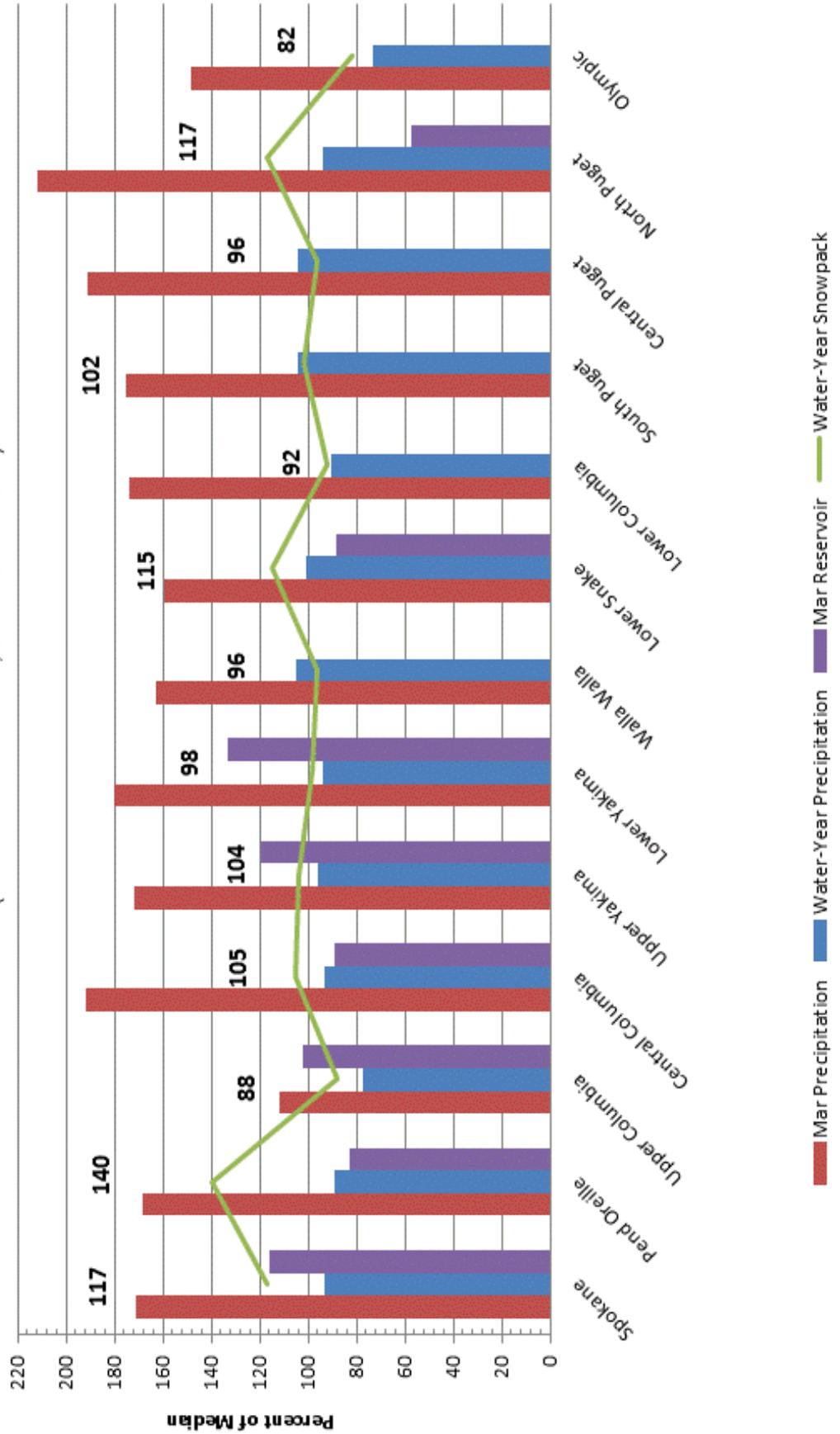
USDA-NRCS Agency Homepages

Washington:
<http://www.wa.nrcs.usda.gov>

NRCS National:
<http://www.nrcs.usda.gov>

April 1, 2014 - Snowpack, Precipitation and Reservoir Conditions at a Glance

(Water Year = October 1, 2013 - Current Date)



Western Snow Conference

The Western Snow Conference is an annual tradition which started in 1932 as an international forum for individuals and organizations to share scientific, management and socio-political information on snow and runoff. The principal aim of the Western Snow Conference is to advance snow and hydrological sciences. The South Continental Area Committee is making plans for the 82nd Annual Western Snow Conference in 2014.

Mark your calendar and start thinking about submitting a paper to attend the 2014 Western Snow Conference:

Dates: April 14-17, 2014

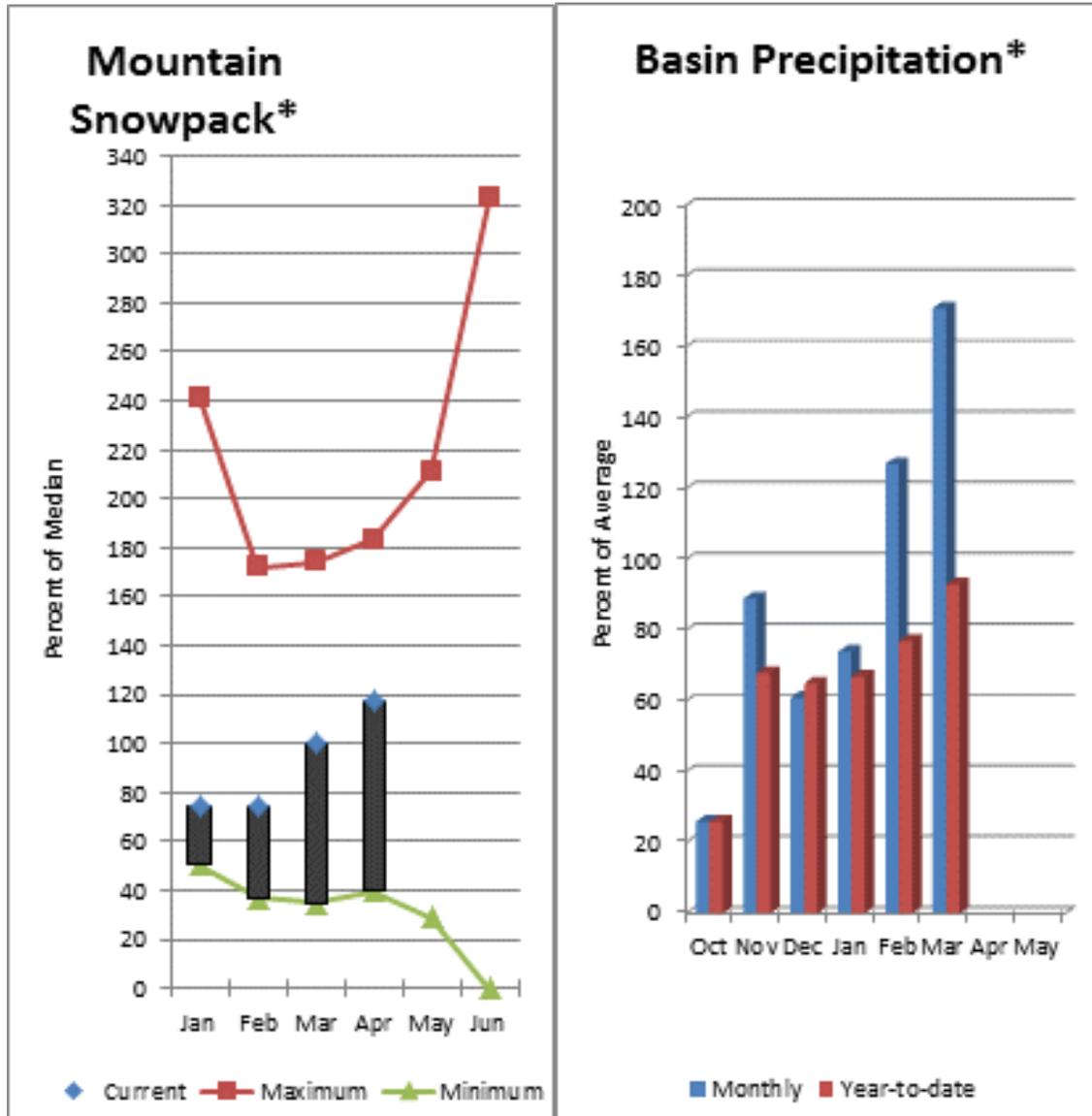
Location: Durango, Colorado

The Technical Tour is scheduled for Thursday, April 17th, to explore current research activities in the Durango/Silverton area led by personnel of the Center for Snow and Avalanche Studies in Silverton. One of their projects is the issue of dust on snow, changes in albedo, accelerated melt, and the subsequent impact on stream flow.

Additional information about the conference and the Call for Papers will be posted on the WSC web page at <http://www.westernsnowconference.org/>.

Also find Western Snow Conference on Facebook and Twitter.

Spokane River Basin



*Based on selected stations

The April 1 forecasts for summer runoff within the Spokane River Basin are 115% of average near Post Falls and 114% at Long Lake. The Chamokane River near Long Lake forecasted to have 83% of average flows for the May-August period. The forecast is based on a basin snowpack that is 117% of normal and precipitation that is 89% of average for the water year. Precipitation for March was above normal at 171% of average. Streamflow on the Spokane River at Spokane was 185% of average for March. April 1 storage in Coeur d'Alene Lake was 192,000 acre feet, 116% of average and 80% of capacity. Snowpack at Quartz Peak SNOTEL site was 96% of average with 18.1 inches of water content. Average temperatures in the Spokane basin were slightly above normal for March and 1-2 degrees below for the water year.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - April 1, 2014

Forecast Point	Forecast Period	Future Conditions						30-Yr Avg. (1000AF)
		Drier		50%		Wetter		
		90% (1000AF)	70% (1000AF)	(1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
Spokane R nr Post Falls (2)	APR-JUL	1050	1580	1950	82	2320	2850	2390
	APR-SEP	1100	1650	2020	81	2390	2940	2480
Spokane R at Long Lake (2)	APR-JUL	1190	1800	2210	84	2620	3230	2620
	APR-SEP	1340	1970	2400	84	2830	3460	2850
Chamokane Ck nr Long Lake	MAY-AUG	1.93	3.9	5.3	57	6.7	8.7	9.3

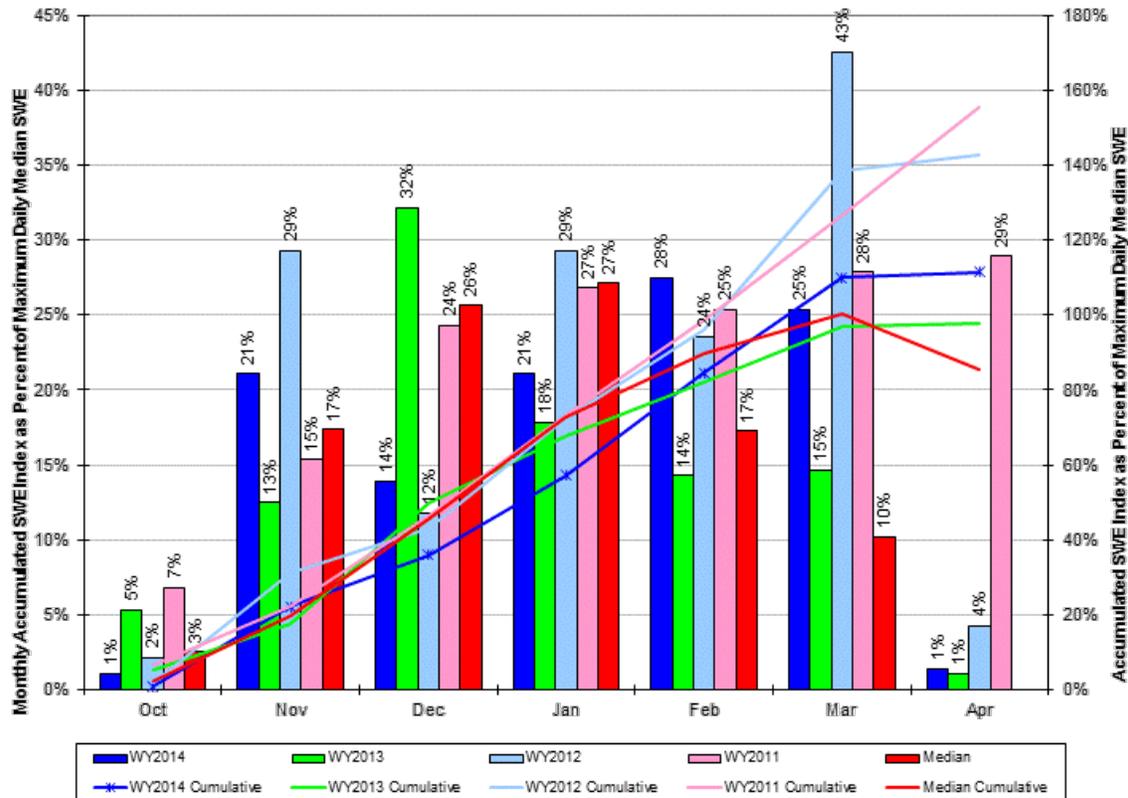
SPOKANE RIVER BASIN Reservoir Storage (1000 AF) - End of December					SPOKANE RIVER BASIN Watershed Snowpack Analysis - January 1, 2014			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Median
Coeur D'alene	238.5	50.4	72.9	93.7	SPOKANE RIVER	13	79	72
					NEWMAN LAKE	1	73	72

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

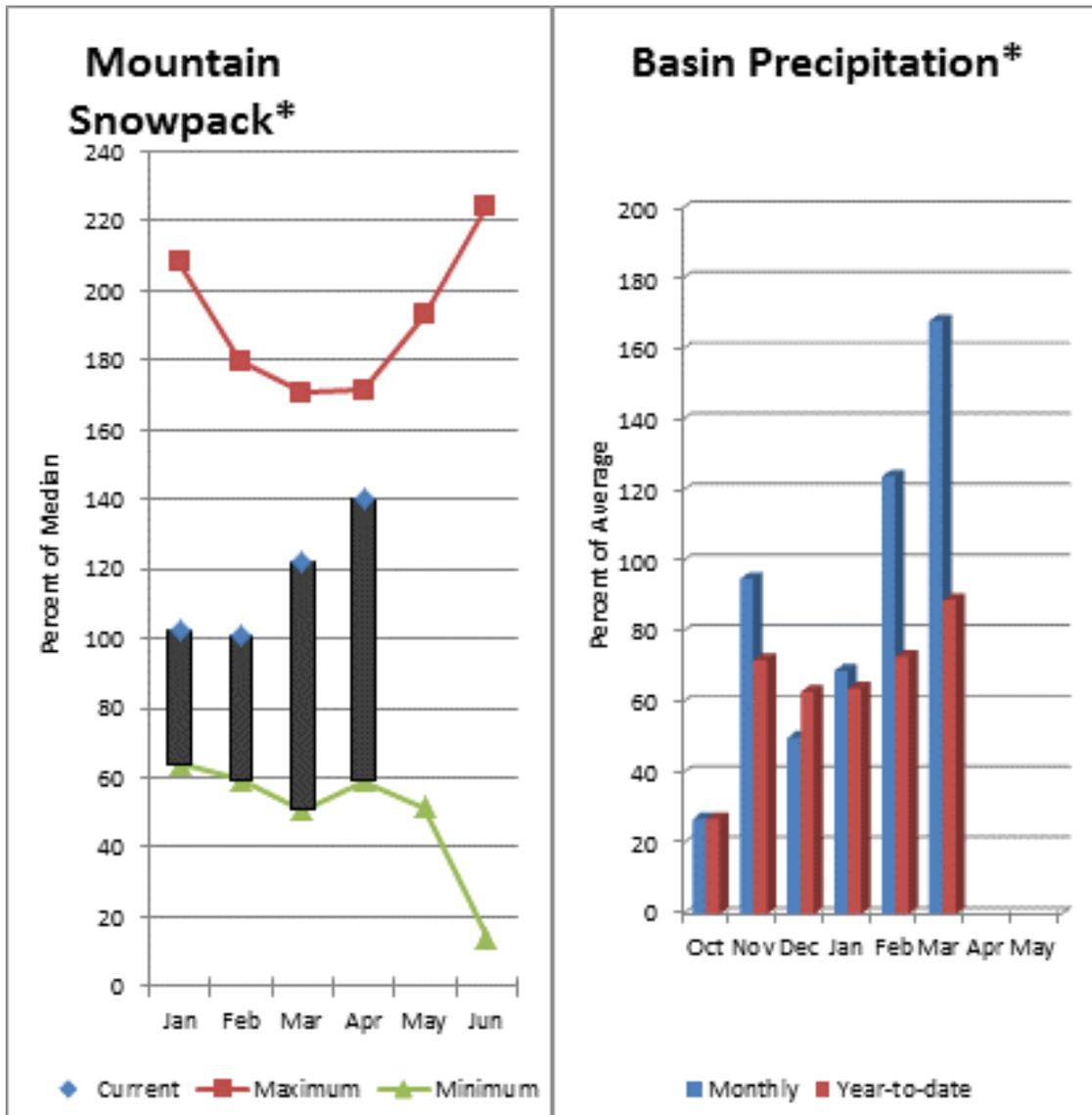
The average is computed for the 1981-2010 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.

PREIST, COEUR D'ALENE, ST. JOE, SPOKANE, PALOUSE
 Time Series Peak Snowpack Summary
 Based on Provisional SNOTEL data as of Apr 07, 2014



Pend Oreille River Basins



*Based on selected stations

The April – September average forecast for the Priest River near the town of Priest River is 86% and the Pend Orielle below Box Canyon is 133%. March streamflow was 133% of average on the Pend Oreille River and 97% on the Columbia Birchbank. April 1 snow cover was 140% of normal in the Pend Oreille River Basin. Bunchgrass Meadows SNOTEL site had 26.8 inches of snow water on the snow pillow. Normally Bunchgrass would have 26.2 inches on April 1. Precipitation during March was 168% of average, keeping the year-to-date precipitation at 89% of average. Reservoir storage in the basin, including Lake Pend Oreille and Priest Lake was 83% of normal. Average temperatures were 1-2 degrees above normal for March and 1-2 degrees below normal for the water year.

For more information contact your local Natural Resources Conservation Service office.

Pend Oreille River Basins

Streamflow Forecasts - April 1, 2014

Forecast Point	Forecast Period	Future Conditions						30-Yr Avg. (1000AF)
		Drier		Wetter		Chance Of Exceeding *		
		90% (1000AF)	70% (1000AF)	30% (1000AF)	10% (1000AF)	50% (1000AF)	(% AVG.)	
Pend Oreille Lake Inflow (2)	APR-JUL	8960	10700	11800	100	12900	14600	11800
	APR-SEP	9950	11700	12900	101	14100	15900	12800
Priest R nr Priest River (1,2)	APR-JUL	215	425	570	73	615	825	780
	APR-SEP	230	455	605	73	655	880	830
Pend Oreille R bl Box Canyon (2)	APR-JUL	9110	10800	12000	101	13200	14900	11900
	APR-SEP	10100	11900	13100	101	14300	16100	13000

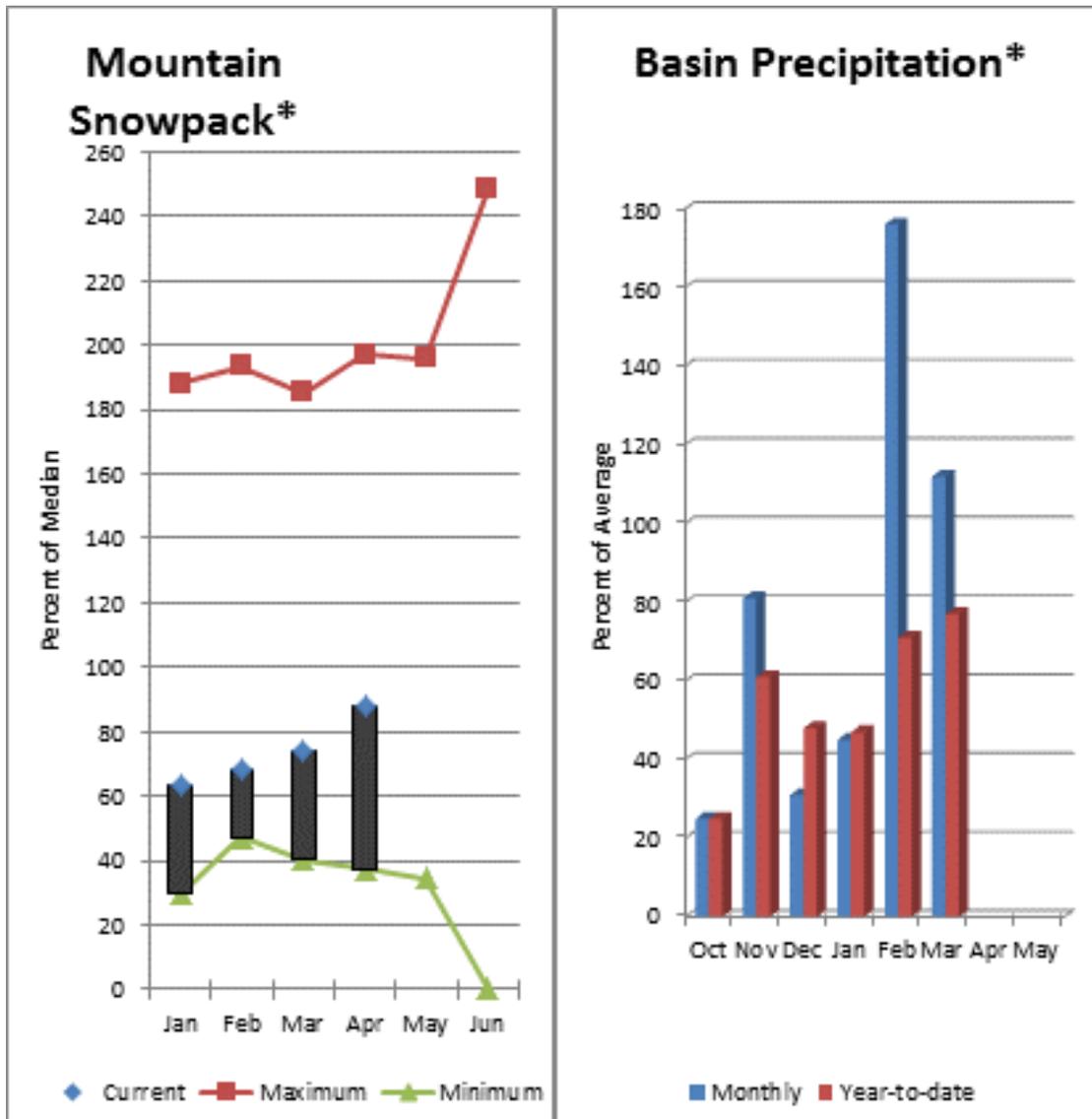
PEND OREILLE RIVER BASINS Reservoir Storage (1000 AF) - End of December					PEND OREILLE RIVER BASINS Watershed Snowpack Analysis - January 1, 2014			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Median
Pend Oreille	1561.	522.6	900.3	708.2	COLVILLE RIVER	0		
Priest Lake Nr Coolin	119.3	54.9	64.1	56.5	PEND OREILLE RIVER	49	105	105
					KETTLE RIVER	1	62	100

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1981-2010 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.

Upper Columbia River Basins



*Based on selected stations

Summer runoff average forecast for the Okanogan River is 135%, Similkameen River is 116%, Kettle River 95% and Methow River is 83%. April 1 snow cover on the Okanogan was 98% of normal, Omak Creek was 64% and the Methow was 111%. March precipitation in the Upper Columbia was 112% of average, with precipitation for the water year at 77% of average. March streamflow for the Methow River was 75% of average, 135% for the Okanogan River and 111% for the Similkameen. Snow-water content at Salmon Meadows SNOTEL was 6.6 inches. Average for this site is 9.1 inches on April 1. Combined storage in the Conconully Reservoirs was 102% of normal and 89% of capacity. Temperatures were 1-2 degrees below normal for March and 1-3 below for the water year.

For more information contact your local Natural Resources Conservation Service office.

Upper Columbia River Basins

Streamflow Forecasts - April 1, 2014

Forecast Point	Forecast Period	<<==== Drier ===== Future Conditions ===== Wetter =====>>						30-Yr Avg. (1000AF)				
		90%		70%		50%			30%		10%	
		(1000AF)	(1000AF)	(1000AF)	(% AVG.)	(1000AF)	(1000AF)		(1000AF)	(1000AF)		
Colville R at Kettle Falls	APR-JUL	9.5	42	72	61	102	146	119				
	APR-SEP	13.1	47	80	61	113	161	131				
Kettle R nr Laurier	APR-JUL	1110	1430	1640	91	1850	2170	1800				
	APR-SEP	1150	1480	1710	91	1940	2270	1880				
Columbia R at Birchbank (1,2)	APR-JUL	22200	27900	30500	90	33100	38800	33840				
	APR-SEP	27600	34800	38000	91	41200	48400	41750				
Columbia R at Grand Coulee (2)	APR-JUL	30700	41100	45900	90	50700	61100	51015				
	APR-SEP	37100	49600	55300	92	61000	73500	60110				
Similkameen R nr Nighthawk (1)	APR-JUL	510	820	960	80	1100	1410	1200				
	APR-SEP	535	870	1020	80	1170	1500	1280				
Okanogan R nr Tonasket (1)	APR-JUL	805	1320	1550	105	1780	2300	1480				
	APR-SEP	870	1450	1720	104	1990	2570	1650				
Okanogan R at Malott (1)	APR-JUL	820	1360	1600	110	1840	2380	1450				
	APR-SEP	885	1490	1770	109	2050	2660	1620				
Methow R nr Pateros	APR-JUL	155	320	435	52	550	715	835				
	APR-SEP	165	340	460	51	580	755	895				

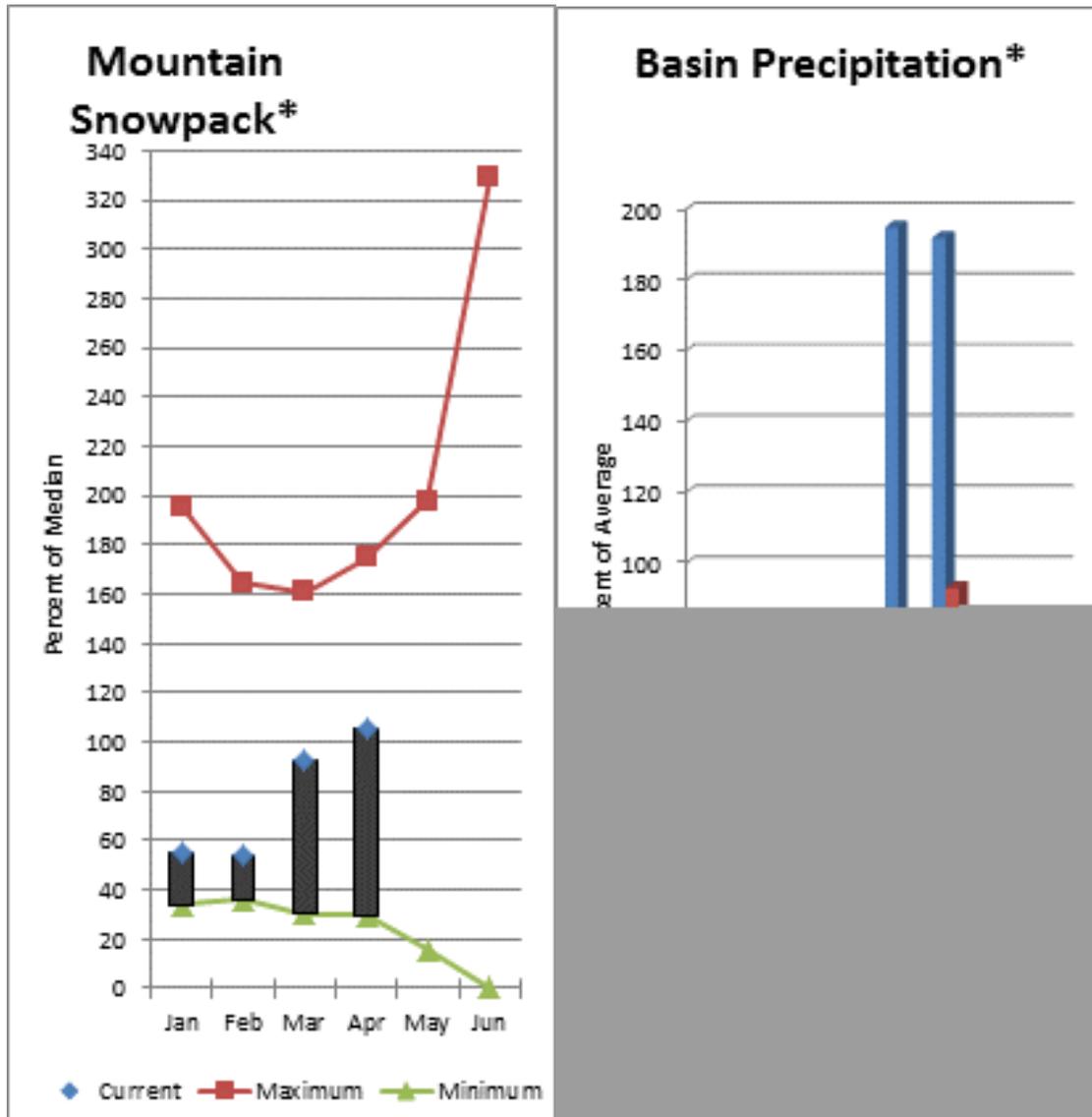
UPPER COLUMBIA RIVER BASINS Reservoir Storage (1000 AF) - End of December					UPPER COLUMBIA RIVER BASINS Watershed Snowpack Analysis - January 1, 2014			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Median
Conconully Lake (salmon Lake Dam)	0.0	9.3	8.5	7.3	OKANOGAN RIVER	2	42	64
Conconully Reservoir	13.0	11.3	9.1	6.5	OMAK CREEK	1	18	41
					SANPOIL RIVER	0		
					SIMILKAMEEN RIVER	0		
					TOATS COULEE CREEK	0		
					CONCONULLY LAKE	1	20	38
					METHOW RIVER	3	43	59

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1981-2010 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.

Central Columbia River Basins



*Based on selected stations

Precipitation during March was 192% of average in the basin and 93% for the water-year-to-date. Runoff for Entiat River is forecast to be 95% of average for 105%, Stehekin River is 102% and Icicle Creek is 103%. March average streamflows on the Chelan River were 112% and on the Wenatchee River 142%. April 1 snowpack in the Wenatchee River Basin was 102% of normal; the Chelan, 109%; the Entiat, 100%; Stemilt Creek, 98% and Colockum Creek, 118%. Reservoir storage in Lake Chelan was 89% of average and 34% of capacity. Lyman Lake SNOTEL had the most snow water with 59.8 inches of water. This site would normally have 57.6 inches on April 1. Temperatures were near normal for March and 1-2 degrees below normal for the water year.

For more information contact your local Natural Resources Conservation Service office.

Central Columbia River Basins

Streamflow Forecasts - April 1, 2014

Forecast Point	Forecast Period	Future Conditions						30-Yr Avg. (1000AF)
		<<===== Drier =====>>		Chance Of Exceeding *		===== Wetter =====>>		
		90% (1000AF)	70% (1000AF)	50% (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
Stehekin R at Stehekin	APR-JUL	365	455	520	76	585	675	680
	APR-SEP	415	515	585	74	655	755	790
Chelan R at Chelan (2)	APR-JUL	480	600	680	68	760	880	1000
	APR-SEP	495	640	735	66	830	975	1120
Entiat R nr Ardenvoir	APR-JUL	52	86	109	55	132	166	200
	APR-SEP	54	90	115	52	140	176	220
Wenatchee R at Plain	APR-JUL	465	615	715	72	815	965	990
	APR-SEP	480	645	755	70	865	1030	1080
Icicle Ck nr Leavenworth	APR-JUL	138	178	205	75	230	270	275
	APR-SEP	150	192	220	73	250	290	300
Wenatchee R at Peshastin	APR-JUL	660	860	995	73	1130	1330	1370
	APR-SEP	675	900	1050	70	1200	1420	1490
Columbia R bl Rock Island Dam (2)	APR-JUL	37500	45400	50800	91	56200	64100	55770
	APR-SEP	44300	53600	60000	92	66400	75700	65200

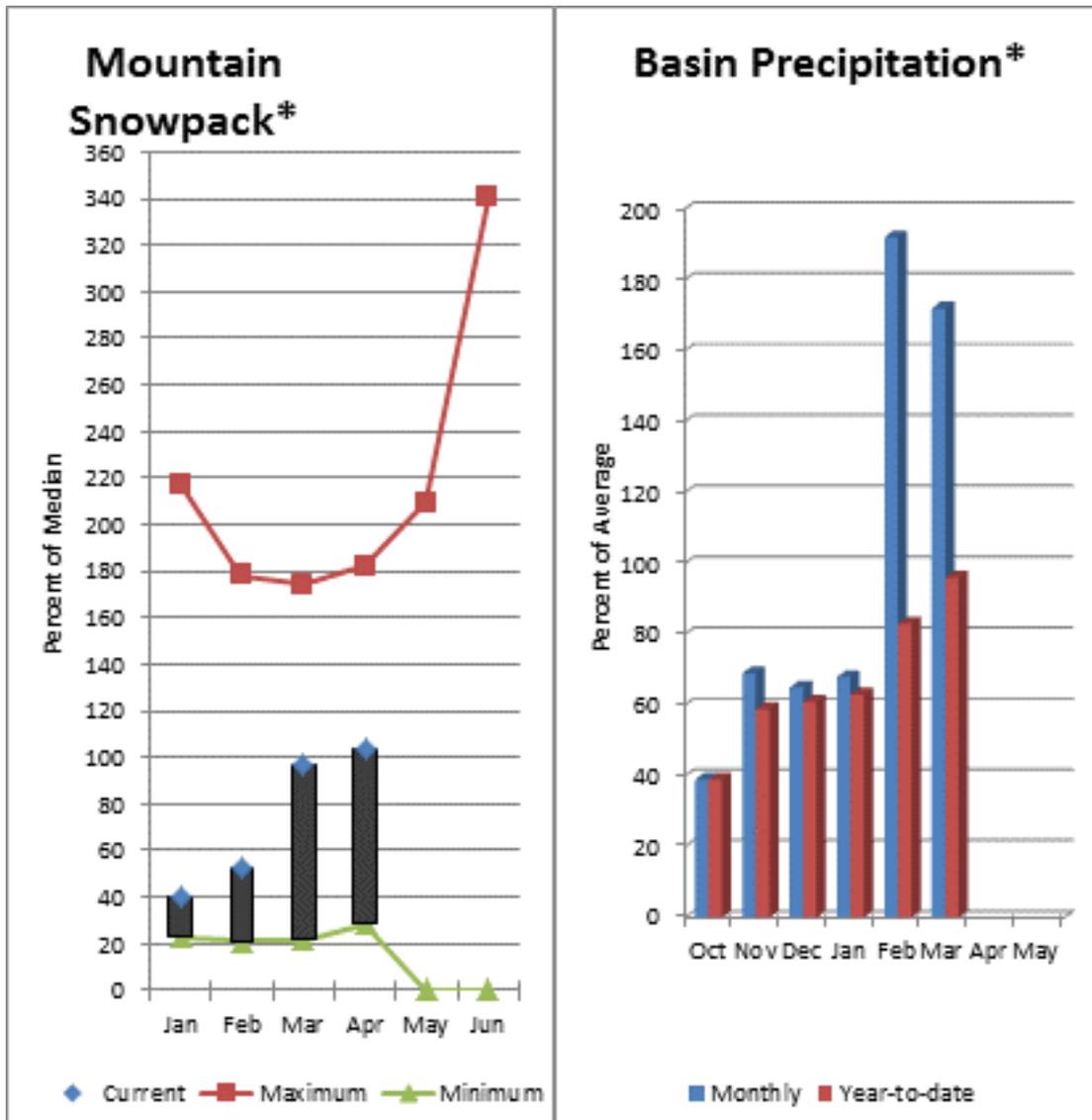
CENTRAL COLUMBIA RIVER BASINS Reservoir Storage (1000 AF) - End of December					CENTRAL COLUMBIA RIVER BASINS Watershed Snowpack Analysis - January 1, 2014			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Median
Lake Chelan	676.1		387.4	411.3	CHELAN LAKE BASIN	3	38	46
					ENTIAT RIVER	1	21	25
					WENATCHEE RIVER	7	42	52
					STEMILT CREEK	1	37	46
					COLOCKUM CREEK	1	61	88

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1981-2010 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.

Upper Yakima River Basin



*Based on selected stations

April 1 reservoir storage for the Upper Yakima reservoirs was 610,000-acre feet, 119% of average. Forecasts for the Yakima River at Cle Elum are 96% of average and the Teanaway River near Cle Elum is at 110%. Lake inflows are all forecasted to be near average this summer as well. March streamflows within the basin were Cle Elum River near Roslyn at 168%. April 1 snowpack was 104% based upon 10 snow course and SNOTEL readings within the Upper Yakima Basin. Precipitation was 172% of average for March and 96% year-to-date for water. Volume forecasts for the Yakima Basin are for natural flow. As such, they may differ from the U.S. Bureau of Reclamation's forecast for the total water supply available, which includes irrigation return flow.

For more information contact your local Natural Resources Conservation Service office.

Upper Yakima River Basin

Streamflow Forecasts - April 1, 2014

Forecast Point	Forecast Period	<<===== Drier ===== Future Conditions ===== Wetter =====>>						30-Yr Avg. (1000AF)		
		90%		70%		50%			30%	
		(1000AF)	(1000AF)	(1000AF)	(1000AF)	(1000AF)	(1000AF)		(1000AF)	(1000AF)
Keechelus Reservoir Inflow (2)	APR-JUL	43	66	81	70	96	119	116		
	APR-SEP	49	72	88	70	104	127	126		
Kachess Reservoir Inflow (2)	APR-JUL	37	58	73	70	88	109	104		
	APR-SEP	42	63	77	68	91	112	113		
Cle Elum Lake Inflow (2)	APR-JUL	175	240	285	74	330	395	385		
	APR-SEP	183	255	300	72	345	415	415		
Yakima R at Cle Elum (2)	APR-JUL	285	425	520	69	615	755	755		
	APR-SEP	315	465	565	68	665	815	830		
Teanaway R bl Forks nr Cle Elum	APR-JUL	20	54	77	59	100	134	130		
	APR-SEP	22	56	79	59	102	136	133		

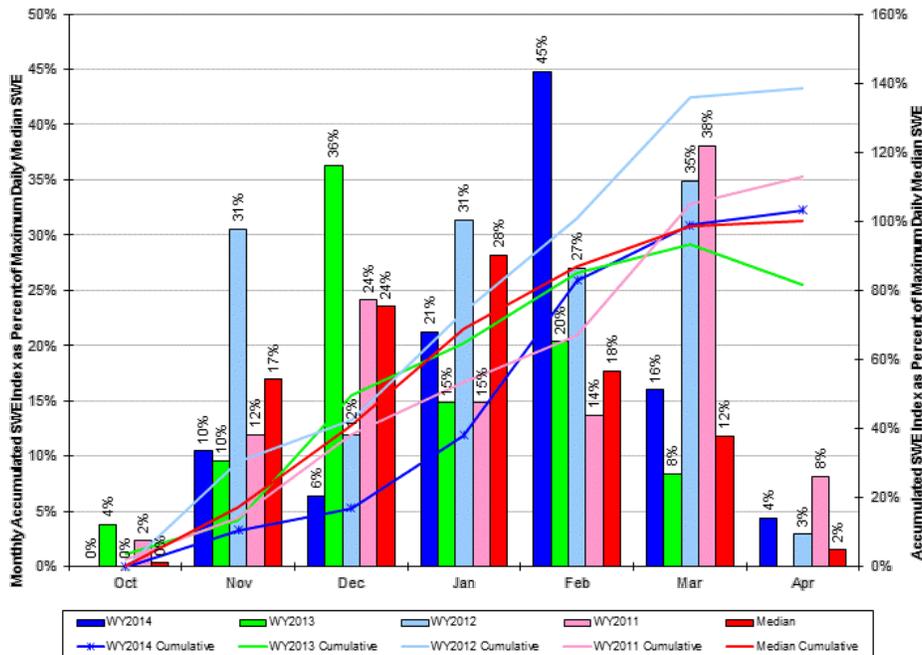
UPPER YAKIMA RIVER BASIN Reservoir Storage (1000 AF) - End of December					UPPER YAKIMA RIVER BASIN Watershed Snowpack Analysis - January 1, 2014			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Median
Keechelus	157.8	85.9	93.7	68.5	UPPER YAKIMA RIVER	8	32	38
Kachess	239.0	162.3	172.7	113.4				
Cle Elum	436.9	163.0	272.6	164.0				

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

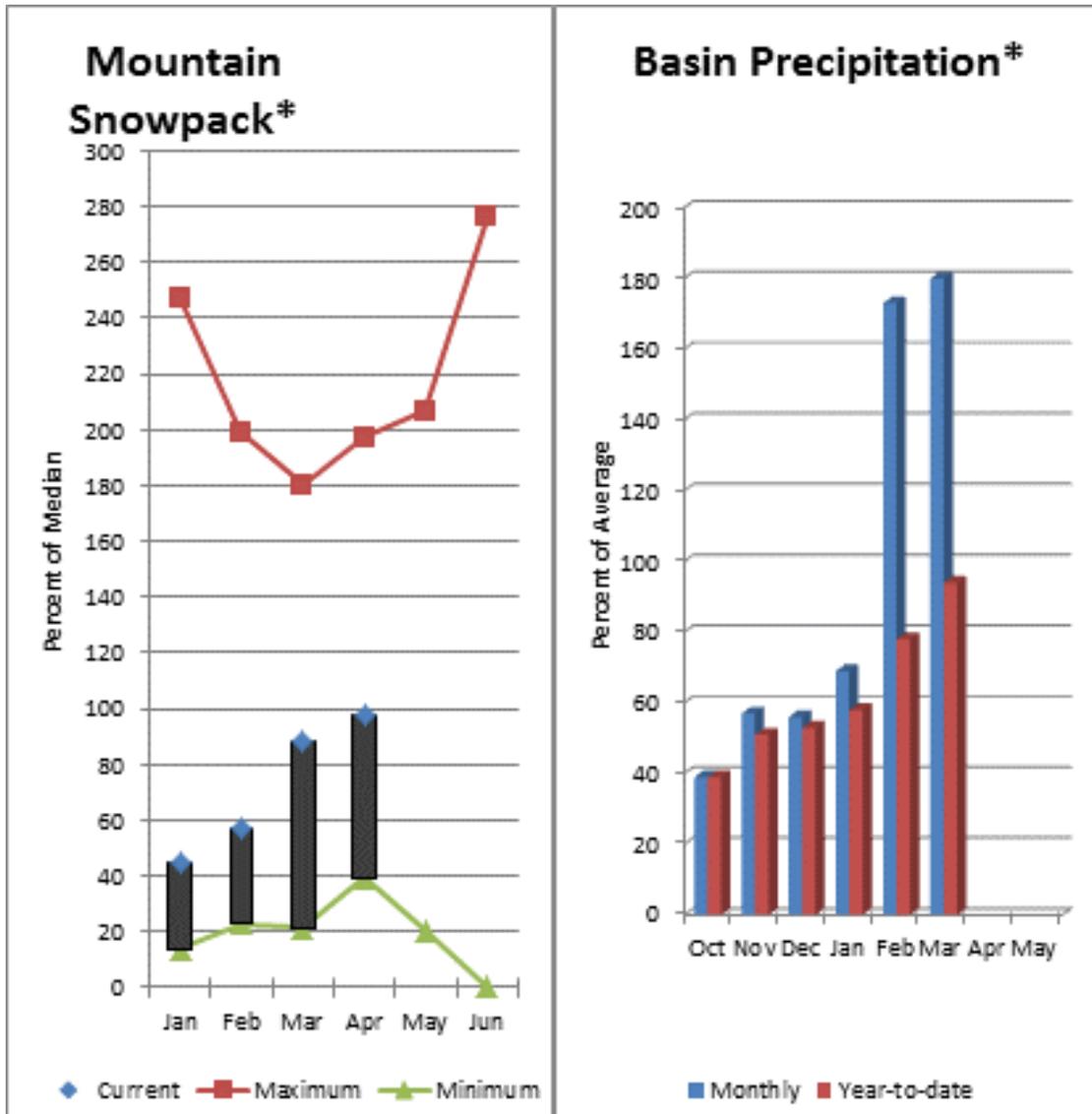
The average is computed for the 1981-2010 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.

UPPER YAKIMA Time Series Peak Snowpack Summary
Based on Provisional SNOTEL data as of April 07, 2014



Lower Yakima River Basin



*Based on selected stations

March average streamflows within the basin were: Yakima River near Parker, 163%; Naches River near Naches, 218%; and Yakima River at Kiona, 132%. April 1 reservoir storage for Bumping and Rimrock reservoirs was 201,000-acre feet, 133% of average. Forecast averages for Yakima River near Parker are 102%; American River near Nile, 97%; Ahtanum Creek, 97%; and Klickitat River near Glenwood, 101%. April 1 snowpack was 98% based upon 7 snow course and SNOTEL readings within the Lower Yakima Basin and Ahtanum Creek reported in at 80% of normal. Precipitation was 180% of average for March and 94% year-to-date for water. Temperatures were near normal for March and for 1-2 degrees below normal for the water year. Volume forecasts for Yakima Basin are for natural flow. As such, they may differ from the U.S. Bureau of Reclamation's forecast for the total water supply available, which includes irrigation return flow.

For more information contact your local Natural Resources Conservation Service office.

Lower Yakima River Basin

Streamflow Forecasts - April 1, 2014

Forecast Point	Forecast Period	<<===== Drier ===== Future Conditions ===== Wetter =====>>						30-Yr Avg. (1000AF)
		90%		70%		50%		
		(1000AF)	(1000AF)	(1000AF)	(1000AF)	(1000AF)	(1000AF)	
Bumping Lake Inflow (2)	APR-JUL	54	73	85	75	97	116	114
	APR-SEP	58	78	91	74	104	124	123
American R nr Nile	APR-JUL	38	54	65	64	76	92	102
	APR-SEP	38	56	68	62	80	98	110
Rimrock Lake Inflow (2)	APR-JUL	101	127	145	78	163	189	187
	APR-SEP	120	150	170	77	190	220	220
Naches R nr Naches (2)	APR-JUL	275	390	470	67	550	665	700
	APR-SEP	285	415	500	66	585	715	760
Ahtanum Ck at Union Gap	APR-JUL	0.85	9.9	16.1	60	22	31	27
	APR-SEP	2.4	11.7	18.0	62	24	34	29
Yakima R nr Parker (2)	APR-JUL	580	885	1090	66	1300	1600	1660
	APR-SEP	640	965	1190	65	1410	1740	1820
Klickitat R nr Glenwood	APR-JUL	47	68	83	66	98	119	126
	APR-SEP	53	76	92	66	108	131	139
Klickitat R nr Pitt	APR-JUL	215	280	325	75	370	435	435
	APR-SEP	275	355	405	78	455	535	520

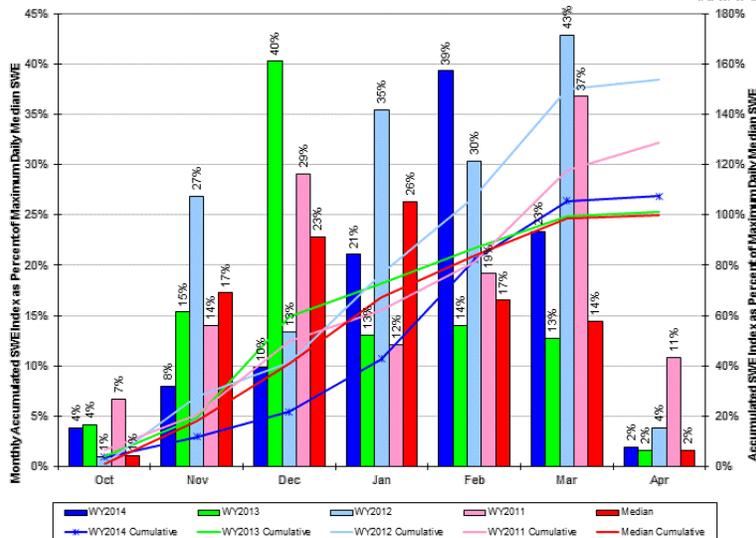
LOWER YAKIMA RIVER BASIN Reservoir Storage (1000 AF) - End of December				LOWER YAKIMA RIVER BASIN Watershed Snowpack Analysis - January 1, 2014				
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Median
Bumping Lake	33.7	21.3	14.4	11.5	LOWER YAKIMA RIVER	7	30	45
Rimrock	198.0	123.9	121.9	92.4	AHTANUM CREEK	2	30	55

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

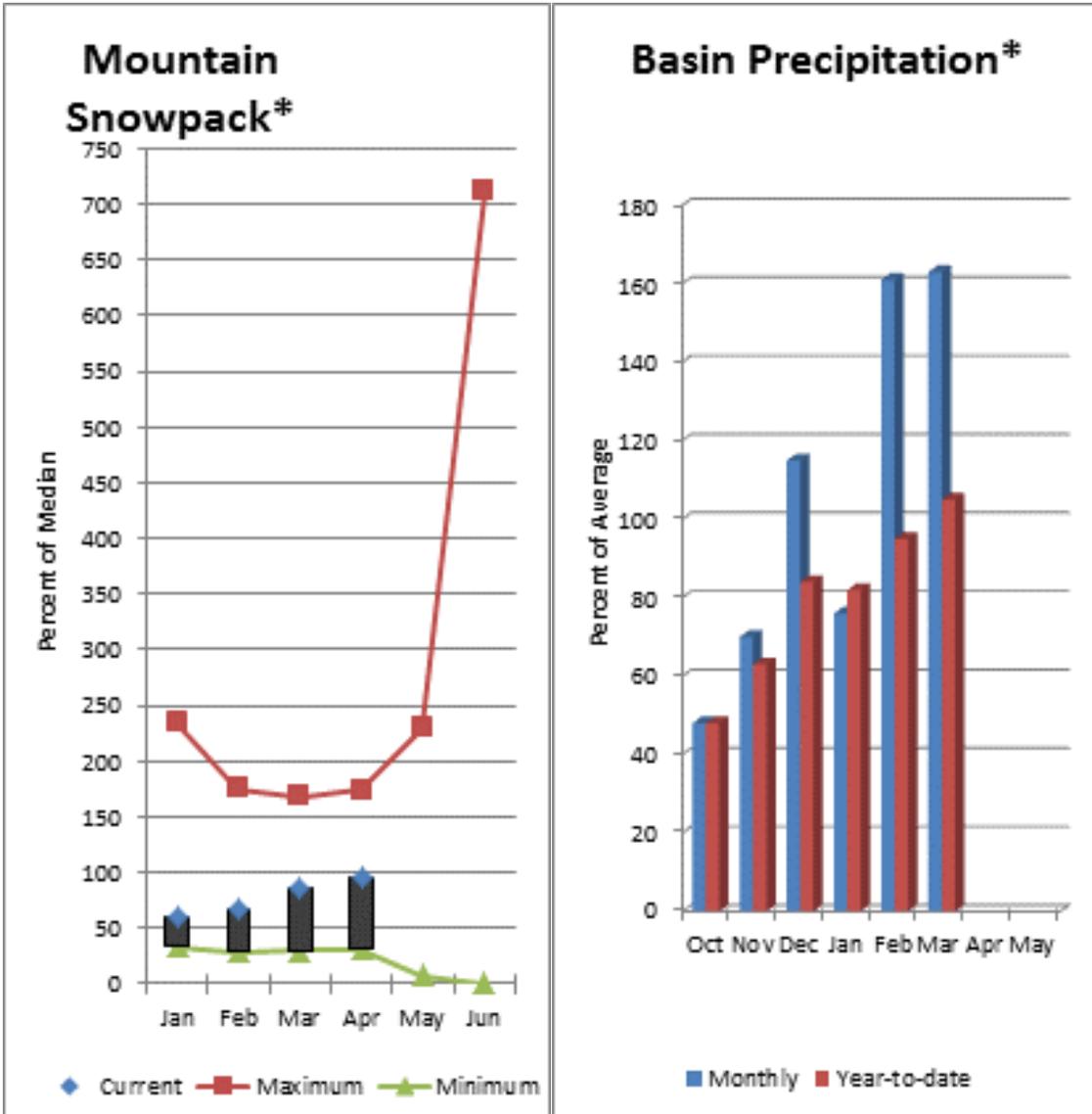
The average is computed for the 1981-2010 base period.

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- (2) - The value is natural volume - actual volume may be affected by upstream water management.

LOWER YAKIMA Time Series Peak Snowpack Summary
Based on Provisional SNOTEL data as of Apr 07, 2014



Walla Walla River Basin



*Based on selected stations

March precipitation was 163% of average, maintaining the year-to-date precipitation at 105% of average. Snowpack in the basin was 96% of normal. Streamflow forecasts are average runoff for both Mill Creek and SF Walla Walla River near Milton-Freewater. Average temperatures were 1-2 degrees above normal for March and 1-3 below normal for the water year.

For more information contact your local Natural Resources Conservation Service office.

Walla Walla River Basin

Streamflow Forecasts - April 1, 2014

Forecast Point	Forecast Period	Future Conditions						30-Yr Avg. (1000AF)
		Drier		Wetter		Chance Of Exceeding *		
		90% (1000AF)	70% (1000AF)	30% (1000AF)	10% (1000AF)	50% (1000AF)	(% AVG.)	
SF Walla Walla R nr Milton-Freewater	MAR-SEP	61	69	74	93	79	87	80
	APR-JUL	38	44	48	89	52	58	54
	APR-SEP	49	55	60	91	65	71	66
Mill Ck nr Walla Walla	APR-JUL	13.0	17.0	19.8	83	23	27	24
	APR-SEP	15.8	20	23	85	26	30	27

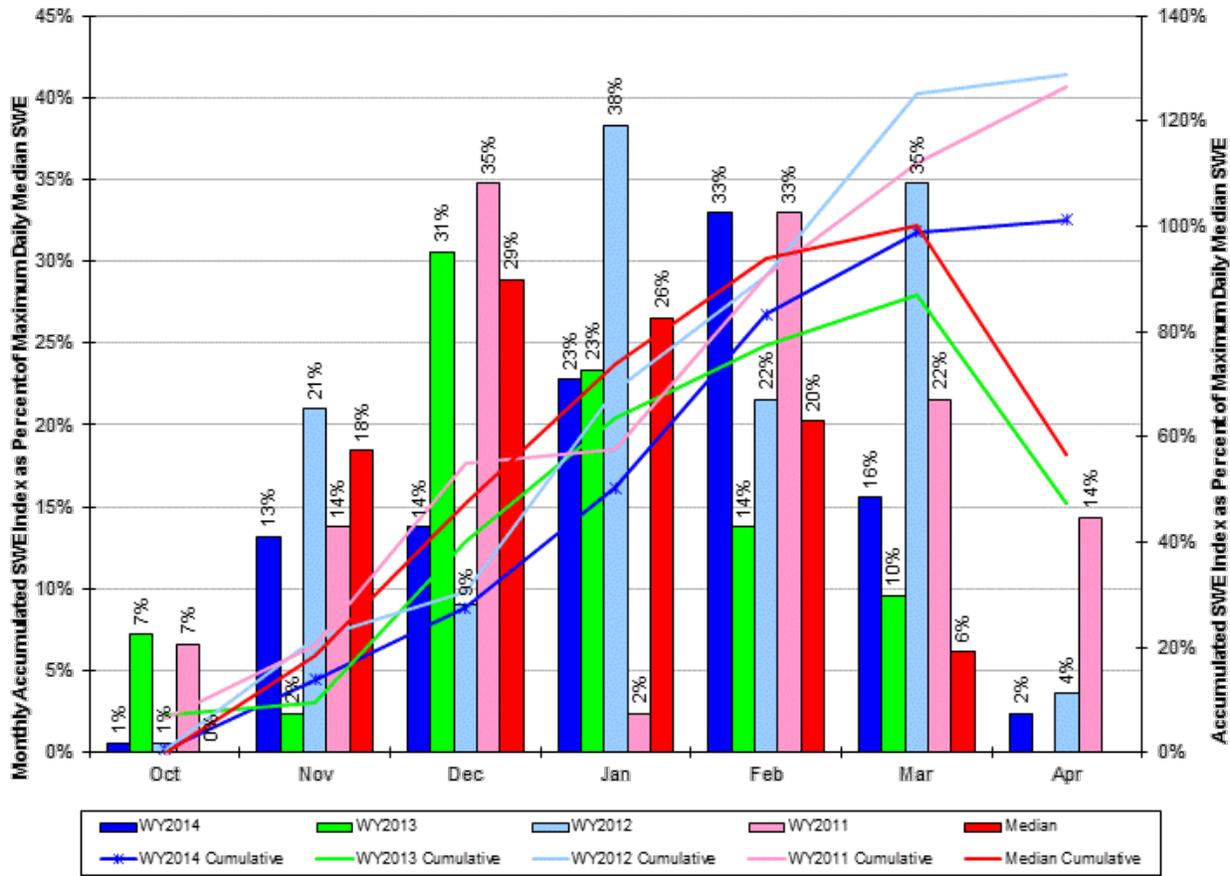
WALLA WALLA RIVER BASIN Reservoir Storage (1000 AF) - End of December				WALLA WALLA RIVER BASIN Watershed Snowpack Analysis - January 1, 2014				
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Median
		2013	2012	Avg	WALLA WALLA RIVER	2	66	59

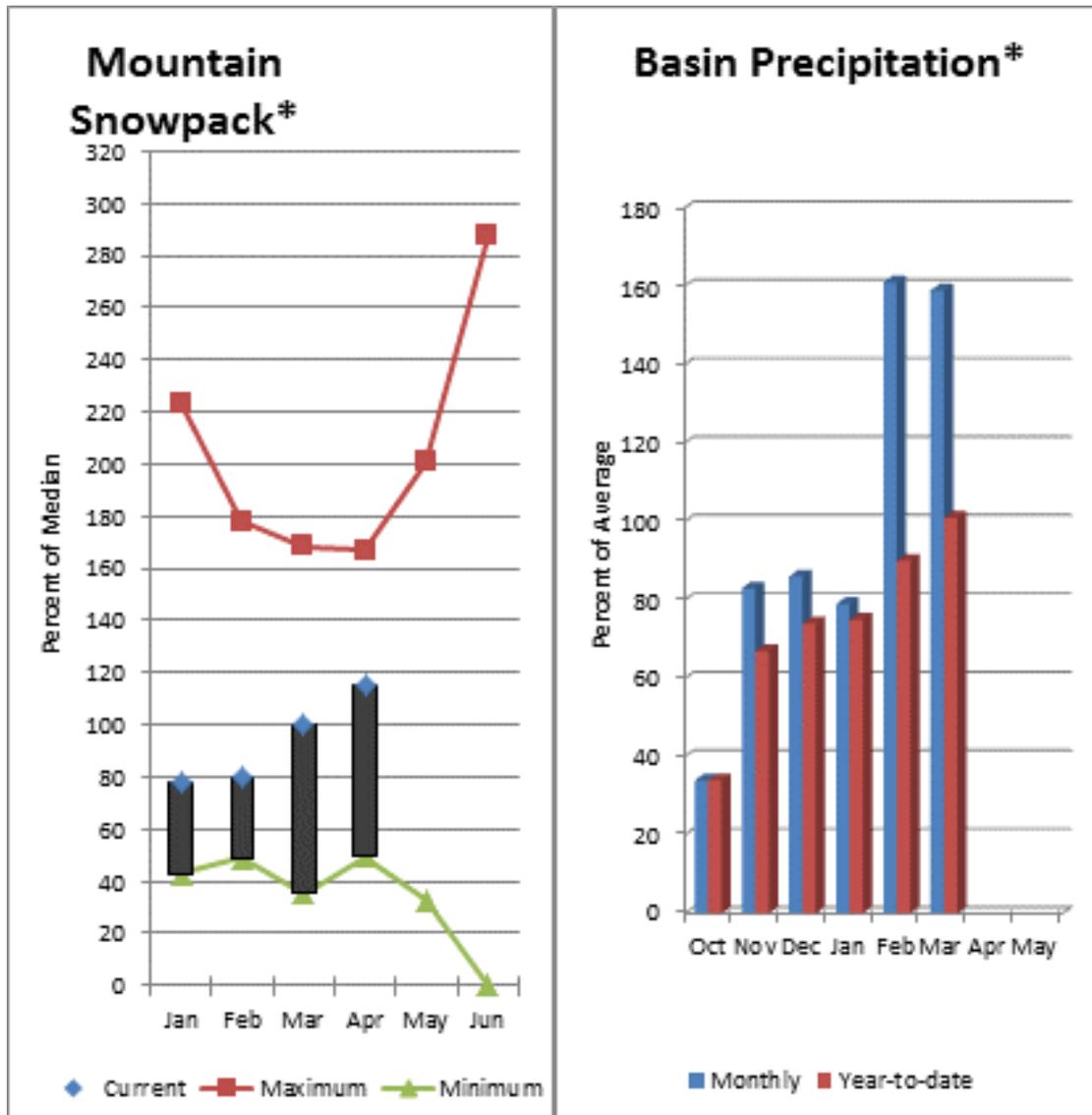
* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1981-2010 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.

WALLA WALLA, TOUCHET Time Series Peak Snowpack Summary
Based on Provisional SNOTEL data as of Apr 07, 2014





*Based on selected stations

The Grande Ronde River can expect summer flows to be about 102% of normal. The forecast for Asotin Creek at Asotin predicts 103% of average flows for the April – July runoff period. March precipitation was 159% of average, bringing the year-to-date precipitation to 101% of average. April 1 snowpack readings averaged 115% of normal. March streamflow was 128% of average for Snake River below Lower Granite Dam and 202% for Grande Ronde River near Troy. Dworshak Reservoir storage was 88% of average. Average temperatures were 1-2 degrees above normal for March and 2-3 degrees below for the water year.

For more information contact your local Natural Resources Conservation Service office.

Lower Snake River Basin

Streamflow Forecasts - April 1, 2014

Forecast Point	Forecast Period	<<===== Drier ===== Future Conditions ===== Wetter =====>>						30-Yr Avg. (1000AF)				
		90%		70%		50%			30%		10%	
		(1000AF)	(1000AF)	(1000AF)	(1000AF)	(1000AF)	(1000AF)		(1000AF)	(1000AF)	(1000AF)	(1000AF)
Grande Ronde R at Troy (1)	MAR-JUL	730	1100	1270	84	1440	1810	1510				
	APR-SEP	575	930	1090	83	1250	1600	1310				
Asotin Ck at Asotin	APR-JUL	8.7	19.6	27	77	34	45	35				
Clearwater R at Spalding (1,2)	APR-JUL	3450	5370	6240	91	7110	9030	6890				
	APR-SEP	3740	5700	6590	91	7480	9440	7270				
Snake R bl Lower Granite Dam (1,2)	APR-JUL	7730	15200	18600	94	22000	29500	19848				
	APR-SEP	9080	17500	21300	96	25100	33500	22280				

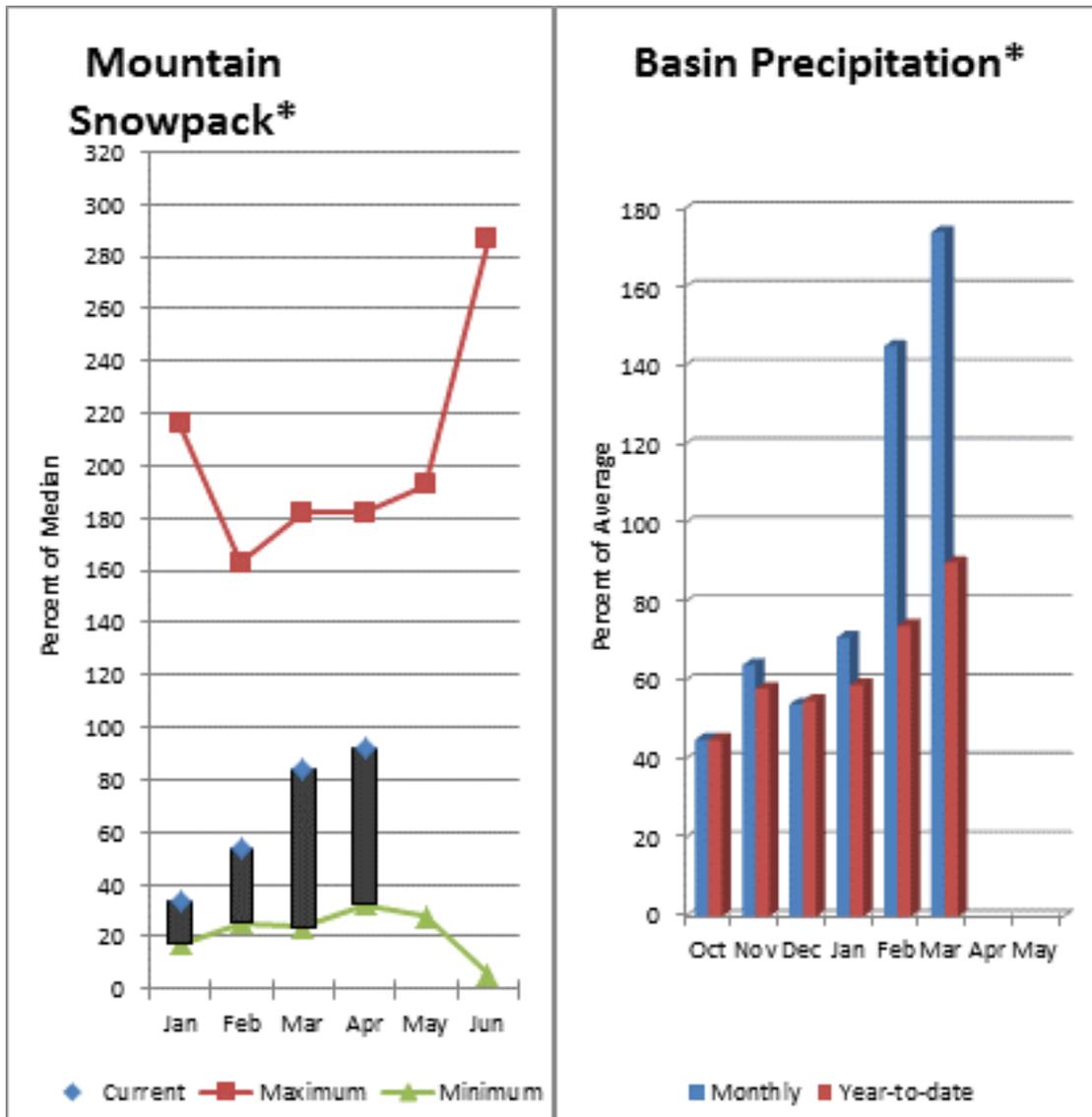
LOWER SNAKE RIVER BASIN Reservoir Storage (1000 AF) - End of December					LOWER SNAKE RIVER BASIN Watershed Snowpack Analysis - January 1, 2014			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Median
Dworshak	3468.	2298.	2565.	2403.	LOWER SNAKE, GRANDE RON	12	104	83

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1981-2010 base period.

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- (2) - The value is natural volume - actual volume may be affected by upstream water management.

Lower Columbia River Basins



*Based on selected stations

Forecasts for April – September streamflows within the basin are Lewis River at Ariel, 87% and Cowlitz River at Castle Rock, 98% of average. The Columbia at The Dalles is forecasted to have 93% of average flows this summer according to the River Forecast Center. March average streamflow for Cowlitz River was 208%. The Columbia River at The Dalles was 126% of average. March precipitation was 174% of average and the water-year average was 90%. April 1 snow cover for Cowlitz River was 114%, and Lewis River was 71% of normal. Temperatures were 1-2 degrees below normal during March and 2-4 below normal for the water year.

For more information contact your local Natural Resources Conservation Service office.

Lower Columbia River Basins

Streamflow Forecasts - April 1, 2014

Forecast Point	Forecast Period	Future Conditions						30-Yr Avg. (1000AF)
		<<===== Drier =====>>		Chance Of Exceeding *		===== Wetter =====>>		
		90% (1000AF)	70% (1000AF)	50% (1000AF)	50% (% AVG.)	30% (1000AF)	10% (1000AF)	
Columbia R at The Dalles (2)	APR-JUL	53100	64800	72700	91	80600	92300	79855
	APR-SEP	63300	76900	86200	93	95500	109000	92704
Klickitat R nr Glenwood	APR-JUL	47	68	83	66	98	119	126
	APR-SEP	53	76	92	66	108	131	139
Klickitat R nr Pitt	APR-JUL	215	280	325	75	370	435	435
	APR-SEP	275	355	405	78	455	535	520
Lewis R at Ariel (2)	APR-JUL	495	670	790	81	910	1080	970
	APR-SEP	585	770	895	80	1020	1200	1120
Cowlitz R bl Mayfield Dam (2)	APR-JUL	830	1130	1340	83	1550	1850	1620
	APR-SEP	890	1270	1530	83	1790	2170	1840
Cowlitz R at Castle Rock (2)	APR-JUL	1340	1640	1850	83	2060	2360	2230
	APR-SEP	1560	1900	2140	85	2380	2720	2520

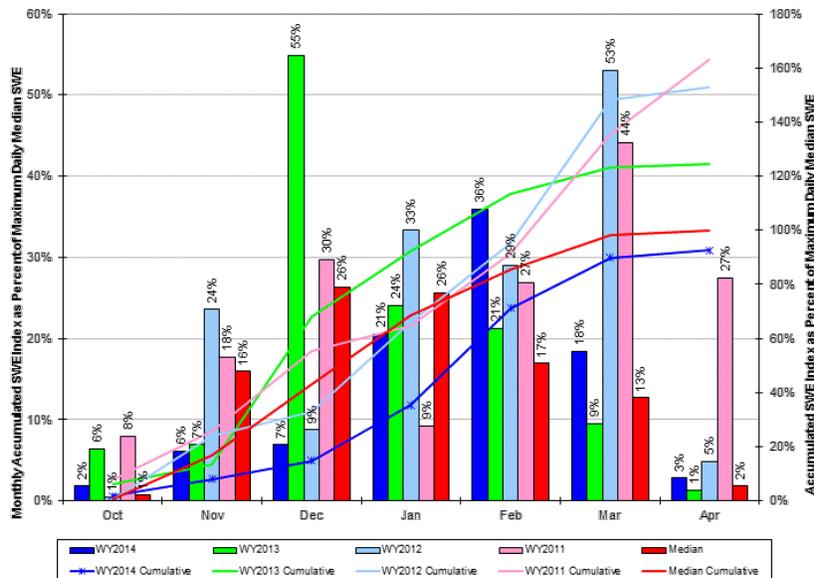
LOWER COLUMBIA RIVER BASINS Reservoir Storage (1000 AF) - End of December				LOWER COLUMBIA RIVER BASINS Watershed Snowpack Analysis - January 1, 2014				
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Median
Swift	0.0		689.0	634.1	LEWIS RIVER	4	11	18
Yale	0.0		383.1		COWLITZ RIVER	6	34	50
Merwin	0.0		404.4	400.1				
Mossyrock Dam (riffe Lk)	0.0		1212.	1203.				

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

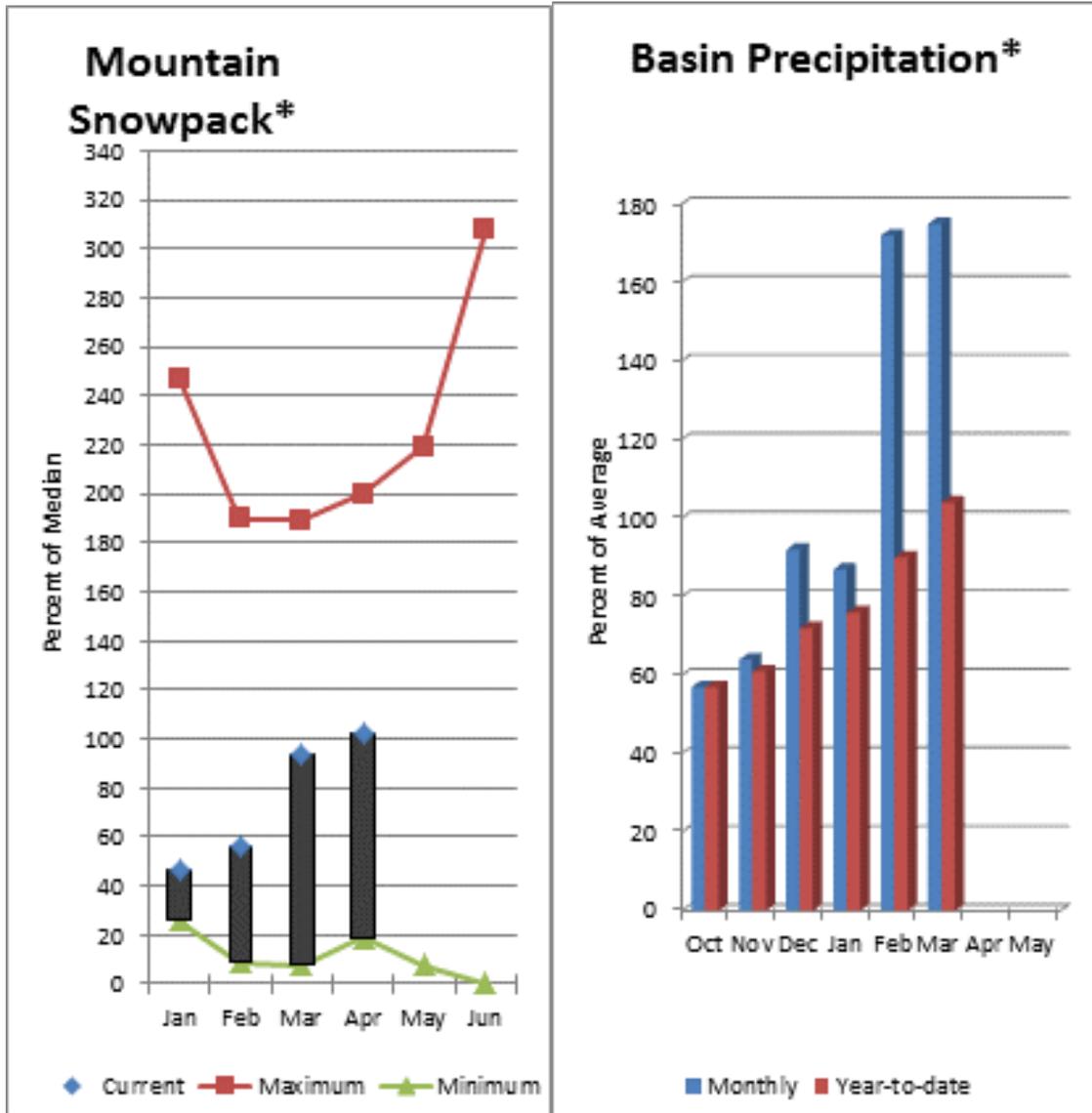
The average is computed for the 1981-2010 base period.

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- (2) - The value is natural volume - actual volume may be affected by upstream water management.

LEWIS, COWLITZ Time Series Peak Snowpack Summary
Based on Provisional SNOTEL data as of Apr 07, 2014



South Puget Sound River Basins



*Based on selected stations

Summer runoff is forecast to be 85% of normal for the Green River below Howard Hanson Dam and 109% for the White River near Buckley. April 1 snowpack was 115% of average for the White River, 112% for Puyallup River and 78% in the Green River Basin. March precipitation was 175% of average, bringing the water year-to-date to 104% of average for the basins. Average temperatures in the area were 1-2 degrees below normal for March and 1-2 below average for the water-year.

For more information contact your local Natural Resources Conservation Service office.

South Puget Sound River Basins

Streamflow Forecasts - April 1, 2014

Forecast Point	Forecast Period	Future Conditions					30-Yr Avg. (1000AF)	
		Drier		Wetter		Chance Of Exceeding * 50% (% AVG.)		
		90% (1000AF)	70% (1000AF)	30% (1000AF)	10% (1000AF)			
White R nr Buckley (1)	APR-JUL APR-SEP	275 340	355 430	390 470	91 91	425 510	505 600	430 515
Green R bl Howard Hanson Dam (1,2)	APR-JUL APR-SEP	99 118	159 178	186 205	79 79	215 230	275 290	235 260

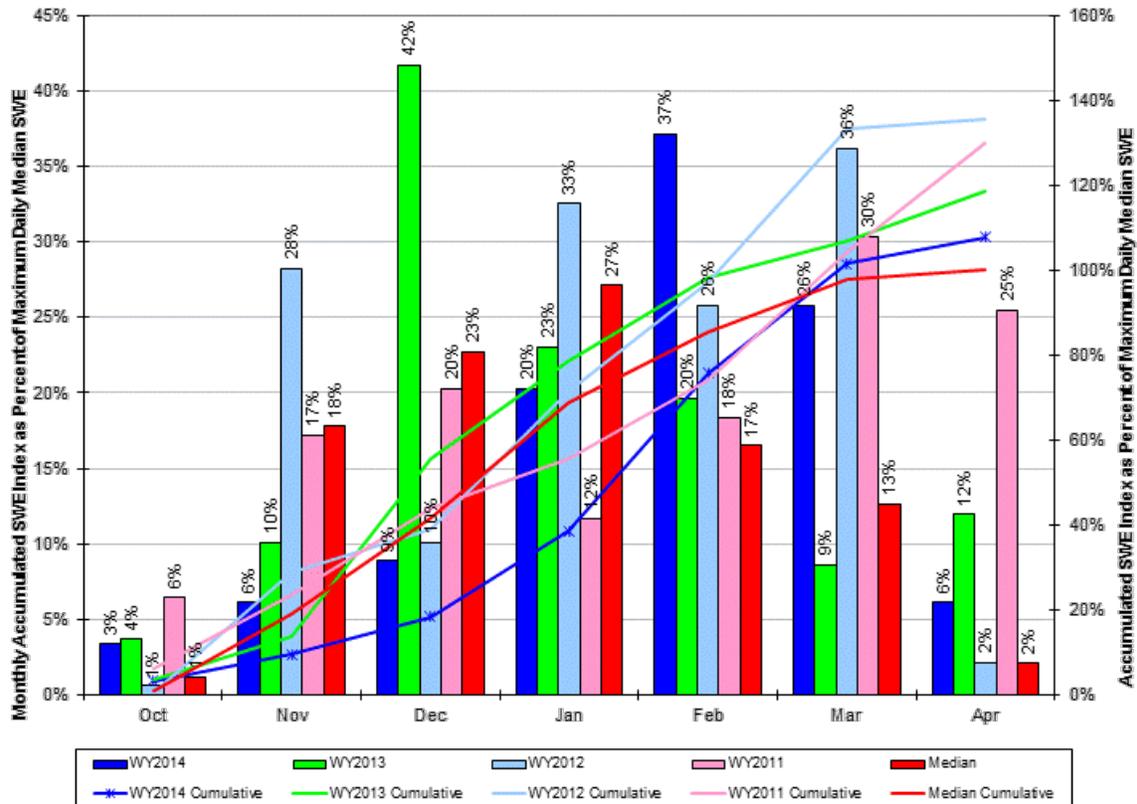
SOUTH PUGET SOUND RIVER BASINS Reservoir Storage (1000 AF) - End of December					SOUTH PUGET SOUND RIVER BASINS Watershed Snowpack Analysis - January 1, 2014			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Median
					WHITE RIVER	3	36	52
					GREEN RIVER	2	16	16
					PUYALLUP RIVER	4	33	51

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

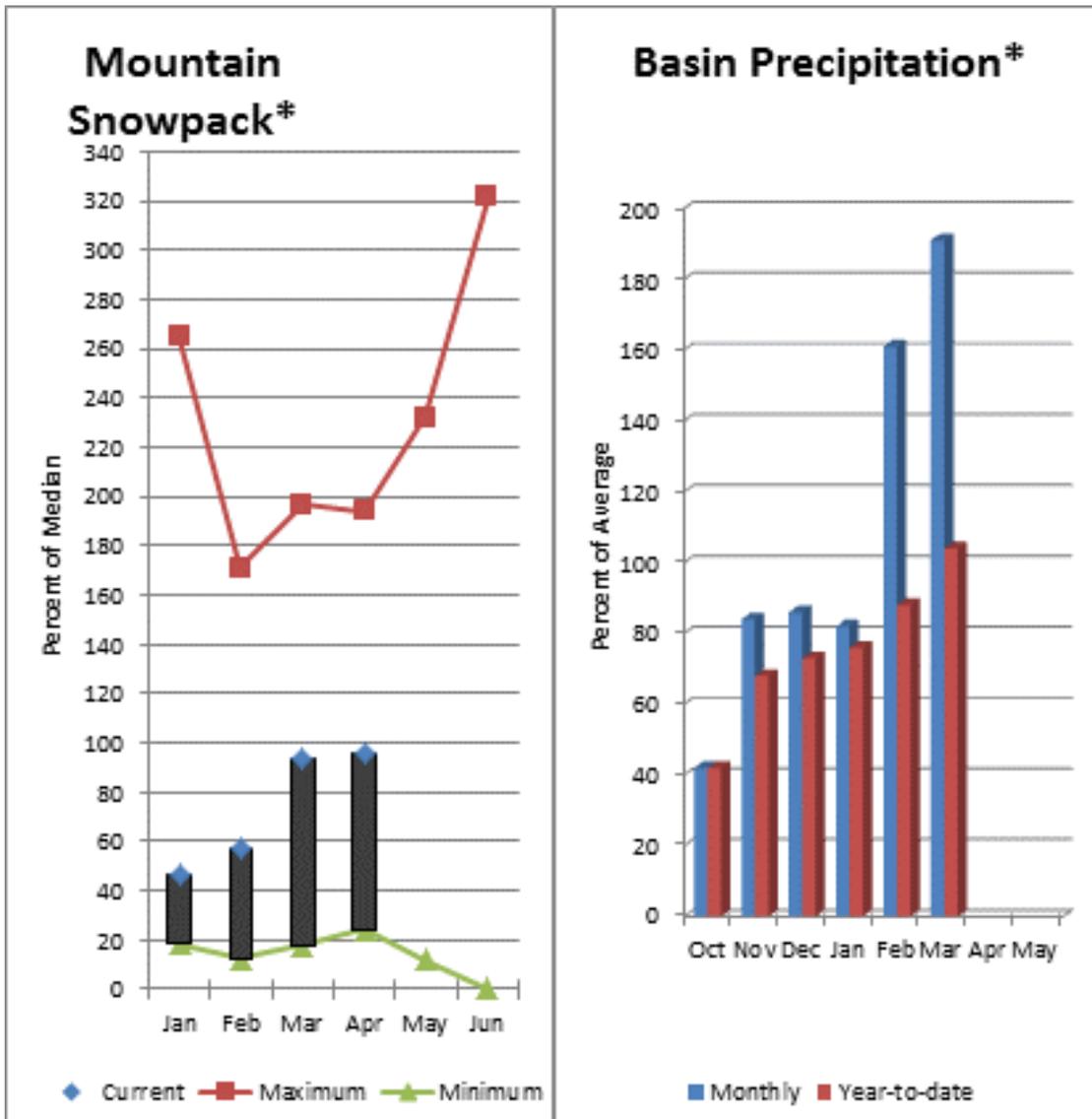
The average is computed for the 1981-2010 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.

WHITE, GREEN, PUYALLUP Time Series Peak Snowpack Summary
Based on Provisional SNOTEL data as of Apr 07, 2014



Central Puget Sound River Basins



*Based on selected stations

Forecast for spring and summer flows are: 108% for Cedar River near Cedar Falls; 104% for Rex River; 122% for South Fork of the Tolt River; and 100% for Taylor Creek near Selleck. Basin-wide precipitation for March was 191% of average, bringing water-year-to-date to 104% of average. April 1 median snow cover in Cedar River Basin was 91%, Tolt River Basin was 100%, Snoqualmie River Basin was 99%, and Skykomish River Basin was 94%. Temperatures were 1-2 degrees below normal for March and for the water-year.

For more information contact your local Natural Resources Conservation Service office.

Central Puget Sound River Basins

Streamflow Forecasts - April 1, 2014

Forecast Point	Forecast Period	Future Conditions						30-Yr Avg. (1000AF)
		Drier		50%		Wetter		
		90% (1000AF)	70% (1000AF)	(1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
Cedar R nr Cedar Falls	APR-JUL	33	48	58	83	68	83	70
	APR-SEP	40	55	65	86	75	90	76
Rex R nr Cedar Falls	APR-JUL	9.2	15.4	19.6	82	24	30	24
	APR-SEP	11.5	17.8	22	81	26	32	27
Taylor Creek nr Selleck	APR-JUL	11.6	15.1	17.4	87	19.7	23	20
	APR-SEP	14.9	18.5	21	88	23	27	24
SF Tolt R nr Index	APR-JUL	7.1	9.8	11.7	82	13.6	16.3	14.2
	APR-SEP	8.5	11.4	13.3	83	15.2	18.1	16.1

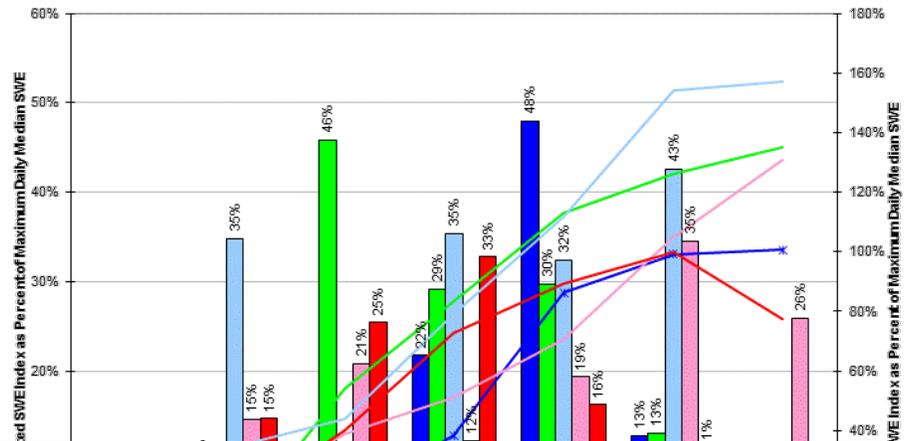
CENTRAL PUGET SOUND RIVER BASINS Reservoir Storage (1000 AF) - End of December				CENTRAL PUGET SOUND RIVER BASINS Watershed Snowpack Analysis - January 1, 2014				
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Median
					CEDAR RIVER	4	21	29
					TOLT RIVER	2	31	53
					SNOQUALMIE RIVER	4	32	44
					SKYKOMISH RIVER	2	44	58

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

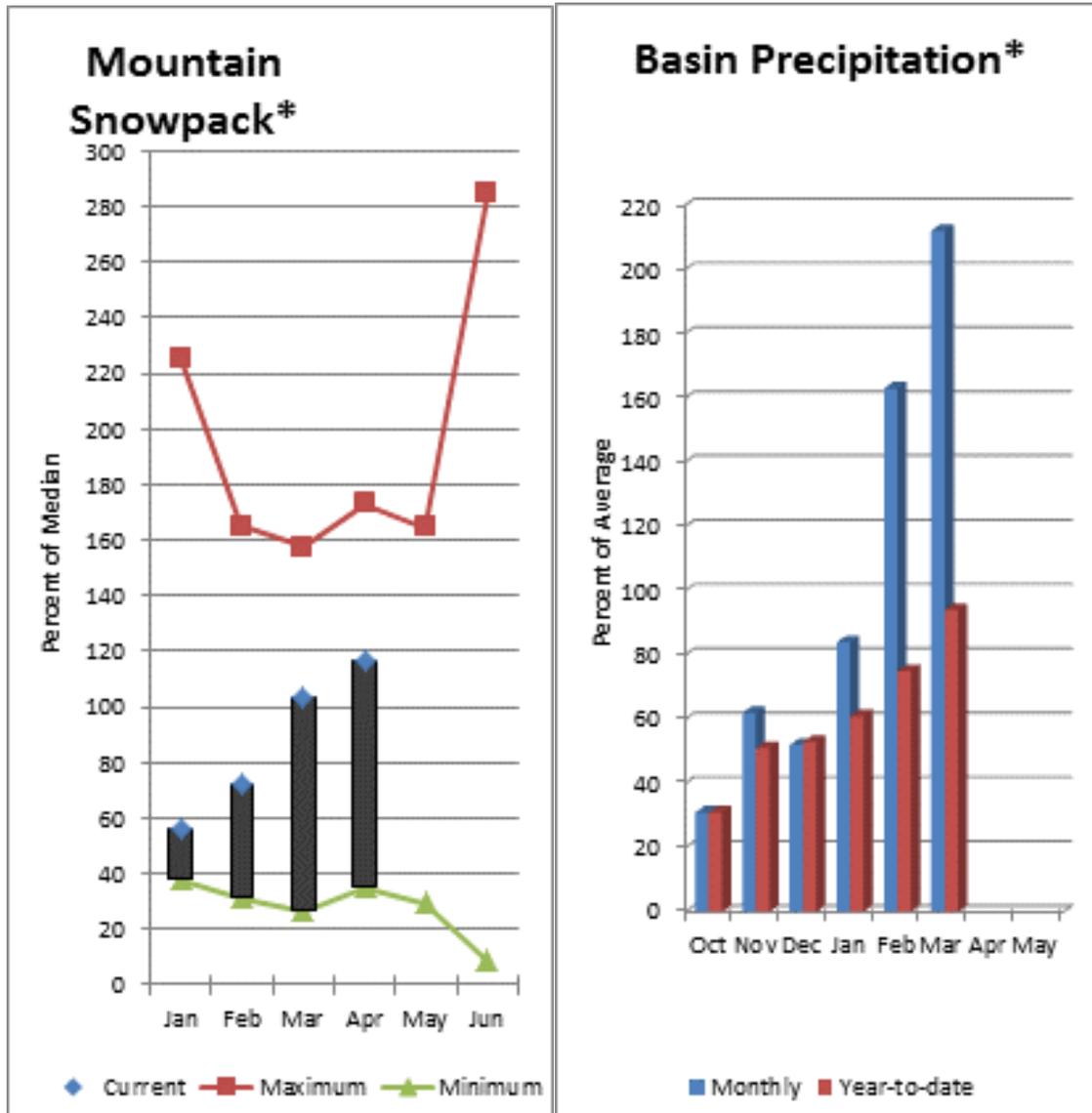
The average is computed for the 1981-2010 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.

CEDAR, SNOQUALMIE, SKYKOMISH Time Series Peak Snowpack Summary
Based on Provisional SNOTEL data as of Apr 07, 2014



North Puget Sound River Basins



*Based on selected stations

Forecast for Skagit River streamflow at Newhalem is 116% of average for the spring and summer period. March streamflow in Skagit River was 185% of average. Other forecast points included Baker River at 110% and Thunder Creek at 104% of average. Basin-wide precipitation for March was 212% of average, bringing water-year-to-date to 94% of average. April 1 average snow cover in Skagit River Basin was 121%, Nooksack River Basin was 117% and the Baker River was 112%. April 1 Skagit River reservoir storage was 57% of average and 30% of capacity in anticipation of a strong runoff season. Average temperatures were 1-2 degrees below normal for March and 1-2 below for the water year.

For more information contact your local Natural Resources Conservation Service office.

North Puget Sound River Basins

Streamflow Forecasts - April 1, 2014

Forecast Point	Forecast Period	<<===== Drier ===== Future Conditions ===== Wetter =====>>						30-Yr Avg. (1000AF)		
		90%		70%		50%			30%	
		(1000AF)	(1000AF)	(1000AF)	(1000AF)	(1000AF)	(1000AF)		(1000AF)	(1000AF)
Thunder Ck nr Newhalem	APR-JUL	171	191	205	87	220	240	235		
	APR-SEP	250	275	290	88	305	330	330		
Skagit R at Newhalem	APR-JUL	980	1170	1300	77	1430	1620	1680		
	APR-SEP	1180	1400	1550	76	1700	1920	2030		
Baker R nr Concrete (2)	APR-JUL	395	500	570	73	640	745	780		
	APR-SEP	495	635	730	74	825	965	980		

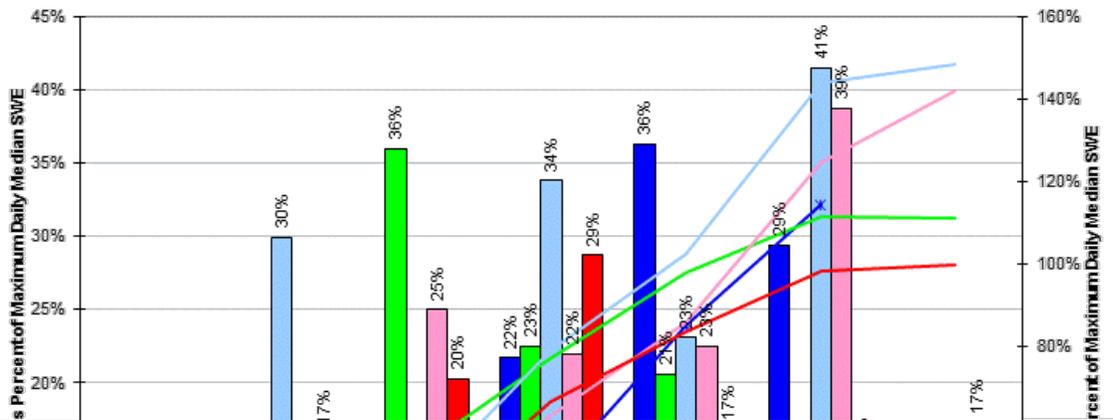
NORTH PUGET SOUND RIVER BASINS Reservoir Storage (1000 AF) - End of December					NORTH PUGET SOUND RIVER BASINS Watershed Snowpack Analysis - January 1, 2014			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Median
Ross	1404.	672.4	1130.	1135.	SKAGIT RIVER	8	31	44
Diablo Reservoir	90.6		85.6	85.8	BAKER RIVER	0		
					NOOKSACK RIVER	3	42	69

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

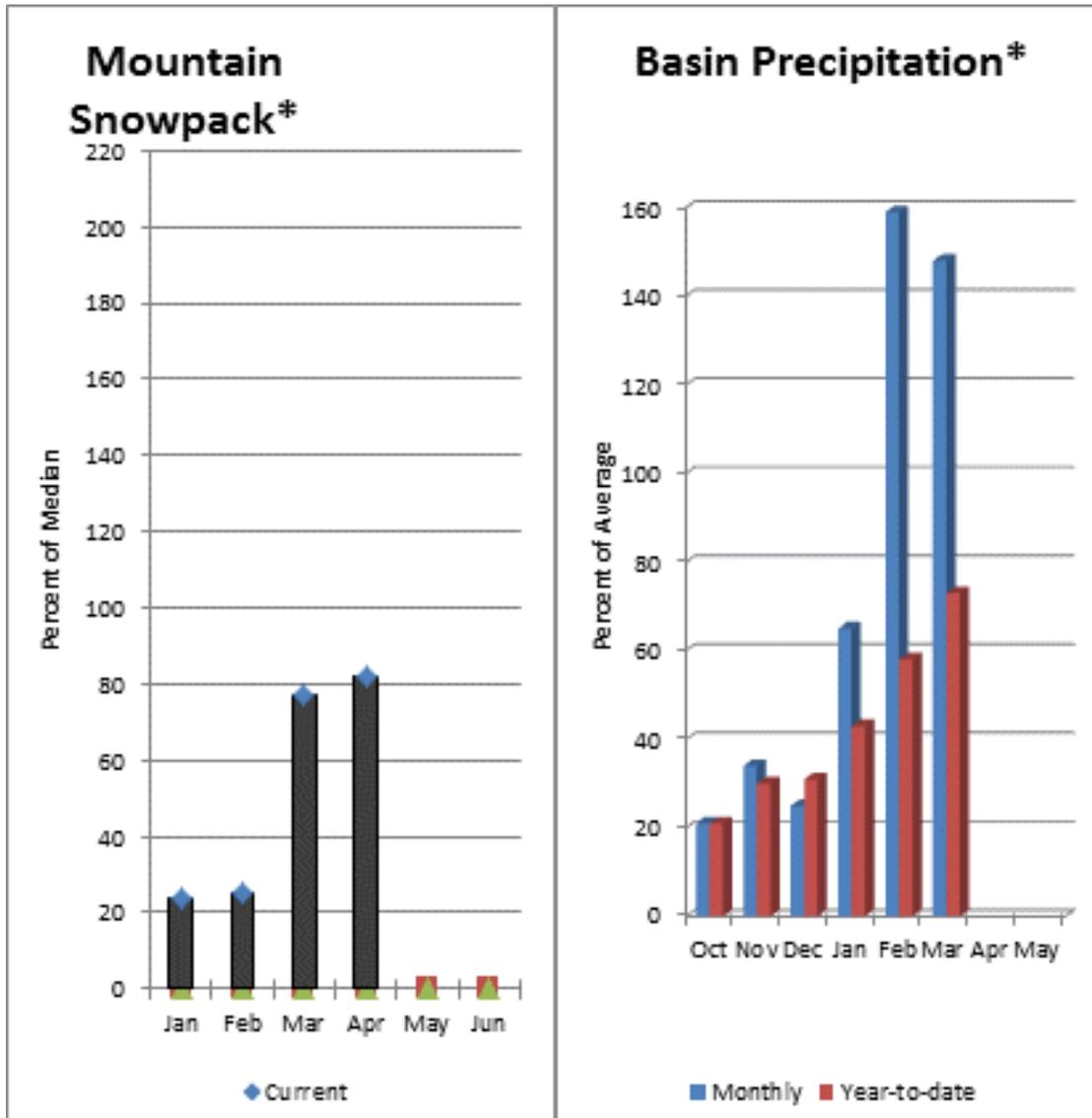
The average is computed for the 1981-2010 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.

BAKER, SKAGIT, NOOKSACK Time Series Peak Snowpack Summary
Based on Provisional SNOTEL data as of Apr 07, 2014



Olympic Peninsula River Basins



*Based on selected stations

Forecasted average runoff for streamflow for the Dungeness River is 97% and Elwha River is 96%. March runoff in the Dungeness River was 178% of normal. Big Quilcene and Wynoochee rivers may expect near to slightly below average runoff this summer as well. March precipitation was 148% of average. Precipitation has accumulated at 73% of average for the water year. March precipitation at Quillayute was 15.81 inches. The 1981-2010 average for March is 10.83 inches. Olympic Peninsula snowpack was still low at 82% of normal on April 1. Temperatures were 1-2 degrees above average for March and close to normal for the water year.

For more information contact your local Natural Resources Conservation Service office.

Olympic Peninsula River Basins

Streamflow Forecasts - April 1, 2014

Forecast Point	Forecast Period	Future Conditions						30-Yr Avg. (1000AF)
		Drier		50%		Wetter		
		90% (1000AF)	70% (1000AF)	Chance Of Exceeding * (1000AF) (% AVG.)		30% (1000AF)	10% (1000AF)	
Dungeness R nr Sequim	APR-JUL	64	80	91	76	102	118	120
	APR-SEP	73	93	106	73	119	139	145
Elwha R at McDonald Bridge	APR-JUL	195	250	285	71	320	375	400
	APR-SEP	225	290	330	70	370	435	470

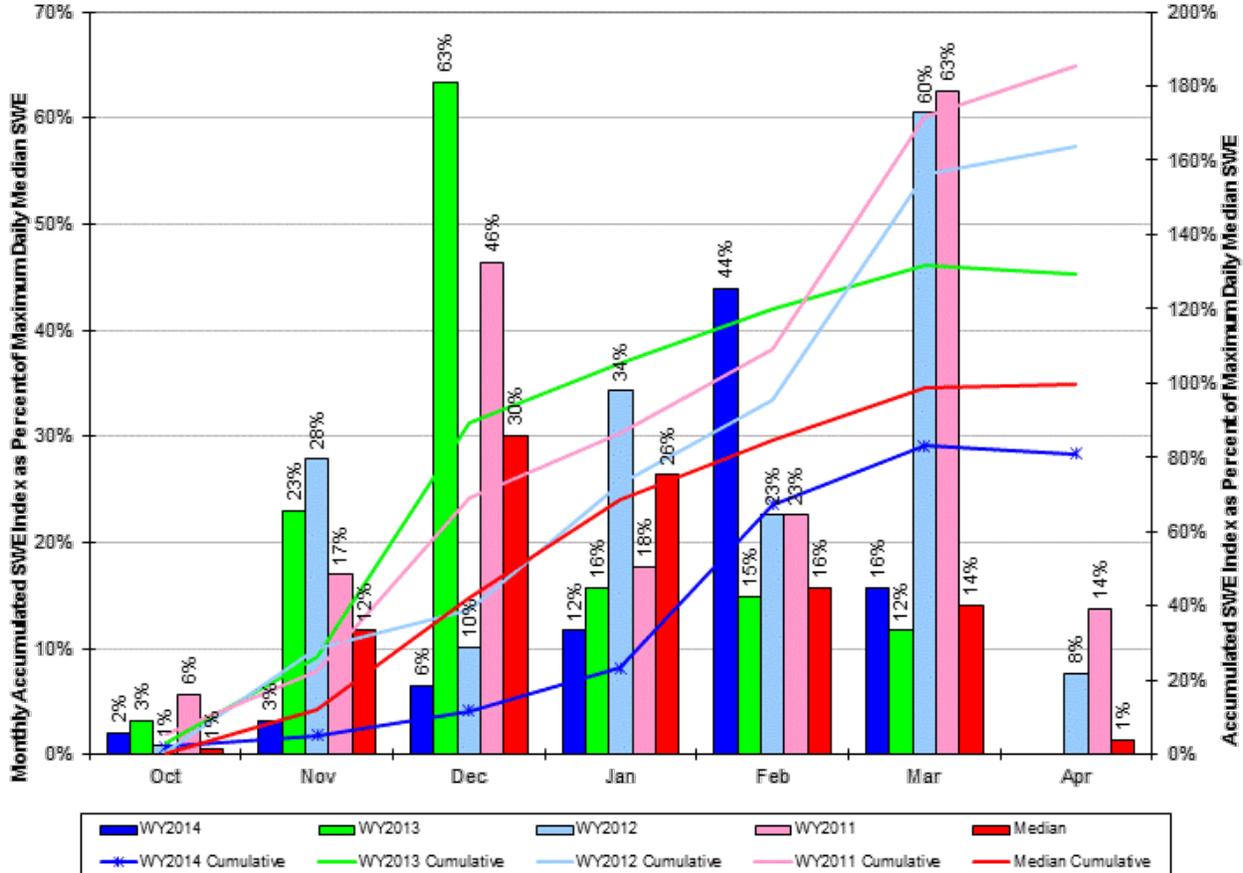
OLYMPIC PENINSULA RIVER BASINS Reservoir Storage (1000 AF) - End of December					OLYMPIC PENINSULA RIVER BASINS Watershed Snowpack Analysis - January 1, 2014			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Median
					OLYMPIC PENINSULA	3	12	24

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1981-2010 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.

OLYMPIC Time Series Peak Snowpack Summary
Based on Provisional SNOTEL data as of Apr 07, 2014



Issued by

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Chief
Natural Resources Conservation Service
U.S. Department of Agriculture

Released by

Roylene Rides At The Door
State Conservationist
Natural Resources Conservation Service
Spokane, Washington

The Following Organizations Cooperate with the Natural Resources Conservation Service in Snow Survey Work*:

Canada	Snow Survey Network Program – British Columbia Ministry of Environment River Forecast Center – British Columbia Ministry of Forests, Lands and Natural Resource Operations
State	Washington State Department of Ecology Washington State Department of Natural Resources
Federal	Department of the Army Corps of Engineers U.S. Department of Agriculture Forest Service U.S. Department of Commerce NOAA, National Weather Service U.S. Department of Interior Bonneville Power Administration Bureau of Reclamation Geological Survey National Park Service Bureau of Indian Affairs Recourse Conservation & Development Councils
Local	City of Tacoma City of Seattle Chelan County P.U.D. Pacific Power and Light Company Puget Sound Energy Washington Water Power Company Snohomish County P.U.D. Colville Confederated Tribes Spokane County Yakama Indian Nation Whatcom County Pierce County Kalispel Tribe of Indians Spokane Indian Tribe Jamestown S'klallum Tribe
Private	Okanogan Irrigation District Wenatchee Heights Irrigation District Newman Lake Homeowners Association Whitestone Reclamation District

*Other organizations and individuals furnish valuable information for the snow survey reports. Their cooperation is gratefully acknowledged.



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Washington Water Supply Outlook Report

Natural Resources Conservation Service
Spokane, WA

